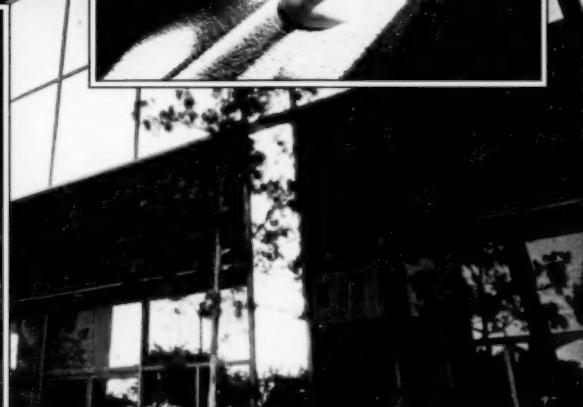


NASA Tech Briefs

Index 1979

National
Aeronautics and
Space
Administration



Vol. 4 (Nos. 1-4) 1979



SP-5021(21)

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INTRODUCTION

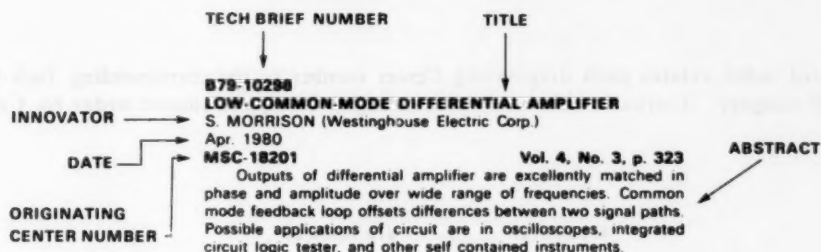
Tech Briefs are short announcements of new technology derived from the research and development activities of the National Aeronautics and Space Administration. These briefs emphasize information considered likely to be transferrable across industrial, regional, or disciplinary lines and are issued to encourage commercial application.

This *Index to NASA Tech Briefs* contains abstracts and four indexes -- subject, personal author, originating Center, and Tech Brief number -- for 1979 Tech Briefs.

Abstract Section

The abstract section is divided into nine categories: Electronic Components and Circuits; Electronic Systems; Physical Sciences; Materials; Life Sciences; Mechanics; Machinery; Fabrication Technology; and Mathematics and Information Sciences. Within each category, abstracts are arranged sequentially by Tech Brief number.

A typical abstract entry has these elements:



The originating Center number in each entry includes an alphabetical prefix that identifies the NASA Center where the Tech Brief originated. A list of prefixes and the corresponding Center names are given on page iii.

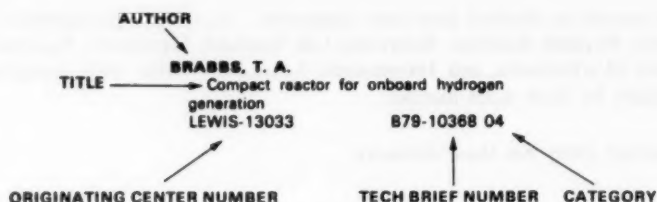
Indexes

Four indexes are provided. The first is a subject index, arranged alphabetically by subject heading. Each entry in the subject index includes a Tech Brief number and a category number to aid the user in locating pertinent entries in the abstract section.

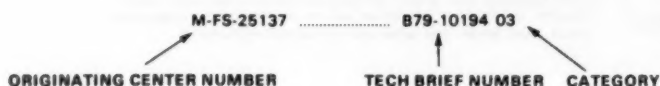


The January 1976 edition of the *NASA Thesaurus* (NASA SP-7050) is used as the authority for the indexing vocabulary that appears in the subject index. The *NASA Thesaurus* should be consulted in examining the current indexing vocabulary, including associated cross-reference structure. Only the subject terms that have been selected to describe the documents abstracted in this issue appear in the subject index. Copies of the *NASA Thesaurus* may be obtained from the National Technical Information Service at \$23.50 for the two-volume set.

The second index is a personal author index. Entries in this index are arranged alphabetically by author's name. Tech Brief and category numbers are supplied to help the user find the appropriate entries in the abstract section.



The third index relates each originating Center number to the corresponding Tech Brief number and category. Entries in this index are arranged in alphanumeric order by Center number.



The fourth index relates each Tech Brief number to its originating Center number. Entries are arranged in ascending Tech Brief number order.



Originating Center Prefixes

ARC	Ames Research Center
FRC	Dryden Flight Research Center
GSFC	Goddard Space Flight Center
HQ	NASA Headquarters
KSC	Kennedy Space Center
LANGLEY	Langley Research Center
LEWIS	Lewis Research Center
M-FS	Marshall Space Flight Center
MSC	Johnson Space Center (formerly Manned Spacecraft Center)
NPO	Jet Propulsion Laboratory/NASA Pasadena Office

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Index to NASA Tech Briefs

June 1980

Abstract Section

01 ELECTRONIC COMPONENTS AND CIRCUITS

B79-10001

WRAPAROUND-CONTACT SOLAR CELLS

C. R. BARAONA, T. M. KLUCHER, J. W. THORNHILL (Spectrolab, Inc.), and J. SCOTT-MONCK (Spectrolab, Inc.)

Aug. 1979 See also NASA-CP-2020 (N78-13527); NASA-CR-135202 (N77-32590)

LEWIS-13089

Vol. 4, No. 1, p. 3

Positive and negative electrical contacts are on back surface of wraparound-contact solar cell. With both terminals on nonilluminated side, cells can be connected back-to-back, and interconnection of many cells can be automated by using printed-circuit techniques. Cells are made by screen-printing layer of dielectric around edge of cell and extending top contact over dielectric to back surface. Wraparound also facilitates application of transparent covers and encapsulants. Efficiencies of cells are in excess of seventeen percent.

B79-10002

EFFICIENT DICHROIC PLATE FOR MICROWAVES

T. E. WISE (Bendix Corp.)

Aug. 1979

GSFC-12171

Vol. 4, No. 1, p. 4

Signal separator for dual-frequency antennas has interlaced crossed slots, or dipole elements. Plate reflects or transmits more efficiently than conventionally-designed microwave dichroic plates in which elements are not interlaced. Interlaced plate also increases bandwidth of dual-frequency antenna in which it is used.

B79-10003

LOW-BACKLOBE MICROWAVE TRANSMITTING HORN

D. A. BATHKER, S. A. BRUNSTEIN, P. W. CRAMER, and W. N. MOULE

Aug. 1979

NPO-14077

Vol. 4, No. 1, p. 5

By superimposing two hybrid modes, backlobes of S-band gain calibration horn are down 70 to 80 dB.

B79-10004

FAST-RESPONSE POWER SAVER FOR INDUCTION MOTORS

F. J. NOLA

Aug. 1979 See also B77-10154

M-FS-23988

Vol. 4, No. 1, p. 6

With control circuit, induction motors run more efficiently at light loads and respond to sudden load changes. It also anticipates power needs so that motor can respond instantly (to a load applied by a clutch, for example).

B79-10005

VHF FREQUENCY MULTIPLIER

J. A. CUSACK (Motorola, Inc.)

Aug. 1979

NPO-13700

Vol. 4, No. 1, p. 7

Low-power step-recovery-diode frequency multiplier generates 361-MHz signal. Diode conducts when ac waveform is positive at its upper terminal. When voltage is negative, diode continues to conduct stored charge in its junction.

B79-10006

FIBER-OPTIC CROSSBAR SWITCH

C. H. BELL

Aug. 1979

KSC-11104

Vol. 4, No. 1, p. 9

Switch automatically crosspatches optical signals with little loss. Device is furnished with local control and remote control. Local control can be manual from control panel or by computer data bus. In remote control, switch is slaved to remote manual panel computer data bus.

B79-10007

IMPROVED INSB PHOTODIODE PREAMPLIFIER CIRCUIT

R. L. ULRICH

Aug. 1979

NPO-14418

Vol. 4, No. 1, p. 9

Integrator compensates for background noise in Fourier spectrometer. Compensation is automatic.

B79-10008

DECISION-DIRECTED AUTOMATIC GAIN CONTROL

W. J. WEBER, III

Aug. 1979

NPO-13639

Vol. 4, No. 1, p. 10

Logic circuitry determines whether gain fluctuation are result of signal-strength changes or of a typical strings of like data symbols. Automatic Gain Control (AGC) system provides tight control that is independent of short-term, average, received signal energy and has negligible degrading effect on probability of error for signal.

B79-10009

SELF-CALIBRATING THRESHOLD DETECTOR FOR NOISY SIGNALS

J. R. BARNES (TRW, Inc.) and M. Y. HUANG (TRW, Inc.)

Aug. 1979

MSC-16370

Vol. 4, No. 1, p. 10

Single time-shared channel is not seriously affected by temperature and aging. Circuit should also be useful in industrial and consumer equipment. For example, it might be incorporated in telemetry for security systems.

B79-10010

LOW-FREQUENCY ATTENUATOR CIRCUIT

W. H. CASH, JR. (Martin Marietta Corp.) and J. T. POLYHEMUS (Martin Marietta Corp.)

01 ELECTRONIC COMPONENTS AND CIRCUITS

Aug. 1979

FRC-11012

Vol. 4, No. 1, p. 11

Circuit uses only single operational amplifier and few passive components to remove background noise from miniature 'wristwatch' pulse detector. It can be applied to other systems where background noise is slowly varying, such as ultrasonics, strain-gage sensors, and accelerometers.

B79-10011

LOW-NOISE CURRENT REGULATOR

J. BUNN (Xerox Corp.)

Aug. 1979

NPO-14070

Vol. 4, No. 1, p. 12

Modification of conventional regulator minimizes current drift. Current to be regulated flows through sensing resistor in series with load, producing voltage that is fed into operational amplifier. Other input into amplifier is reference voltage from Zener diode network.

B79-10012

IMPROVED ISOLATION IN DOUBLE-BALANCED MIXERS

P. H. STANTON

Aug. 1979

NPO-14415

Vol. 4, No. 1, p. 13

Bypass circuit eliminates unwanted leakage in output RF signal. Correction circuit was developed for phase-shift-keyed transmitters. Principle can be adapted to correct leakage in other types of RF circuitry as well.

B79-10013

RELIABILITY OF IMAGING CCD'S

J. R. BEAL (Martin Marietta Corp.), M. D. BORENSTEIN (Martin Marietta Corp.), R. A. HOMAN (Martin Marietta Corp.), D. L. JOHNSON (Martin Marietta Corp.), D. D. WILSON (Martin Marietta Corp.), and V. F. YOUNG (Martin Marietta Corp.)

Aug. 1979

M-FS-25039

Vol. 4, No. 1, p. 14

Report on reliability of imaging charge-coupled devices (CCD's) is intended to augment rather meager existing information on CCD reliability. Study focuses on electrical and optical performance tests, packaging constraints, and failure modes of one commercially available device (Fairchild CCD121H).

B79-10014

GROUP-DELAY STANDARDS

R. W. BEATTY, L. J. DERR, and T. Y. OTOSHI

Aug. 1979

NPO-13938

Vol. 4, No. 1, p. 14

Delay-line standards have been tested by three independent laboratories using six different methods. Results are published in report showing delay values obtained from 15-, 30-, and 60-ns cables by different laboratories. Study of potential error sources indicates that reflection errors due to discontinuities at ends of cables are usually small.

B79-10154

COMPUTATION-SAVING DIGITAL FILTER

D. J. SOWADA (Honeywell, Inc.)

Dec. 1979

MSC-18057

Vol. 4, No. 2, p. 167

Two stage digital low-pass filter circuit that averages input over given period and filters average over comparatively slow rate, reduces computation, speed, and word-length requirements. Applications include data preprocessing before entry to central processor.

B79-10155

IMPROVED SILICON/CARBON INTERFACE FOR SOLAR CELLS

D. J. ZOOK (Honeywell, Inc.)

Dec. 1979

NPO-14421

Vol. 4, No. 2, p. 168

Resistance measurements showing that vitreous graphite remains almost wholly intact even after 1 hour of contact with silicon melt indicates that vitreous carbon may be superior to

rubbed-on graphite as interface between ceramic substrate and silicon layer of solar cell.

B79-10156

IMPROVED METALIZED POLYCARBONATE CAPACITOR

H. J. KELLERMAN (Component Research Co.)

Dec. 1979 See also NASA-CR-150460 (N77-85673)

M-FS-25142

Vol. 4, No. 2, p. 168

Modified metallized polycarbonate-film capacitor withstands 500 thermal cycles between 55 and 125 C replacing conventional devices which typically withstand 10 such cycles.

B79-10157

BINARY-TO-MANCHESTER ENCODERS

R. H. ST. CYR, III (Rockwell International Corp.), W. HU (The Garrett Corp.), and R. LATSHAW (The Garrett Corp.)

Dec. 1979

MSC-16546

Vol. 4, No. 2, p. 169

Two circuit system converts 16-bit-word binary encoded data to 24-bit Manchester II code to allow easy interface of flight simulators with aircraft communications equipment.

B79-10158

VERSATILE DIGITAL SIGNAL PROCESSOR FOR DC TO DC CONVERTERS

J. L. BIESS (TRW, Inc.), L. Y. INOUE (TRW, Inc.), and Y. YU (TRW, Inc.)

Dec. 1979 See also NASA-CR-135072 (N77-32398)

LEWIS-13020

Vol. 4, No. 2, p. 170

Digital signal processor (DSP) for dc-to-dc converters, processes all incoming signals and transmits correct signal to operate power switch.

B79-10159

DIGITAL PHASE SHIFTER

M. G. PERRY (Vought Corp.)

Dec. 1979

LANGLEY-12338

Vol. 4, No. 2, p. 171

Device requiring only TTL integrated circuits and single 5-volt power supply, varies phase shift of digital input over approximate range of 15 to 165 deg.

B79-10160

IMPROVED READER FOR MAGNETICALLY-ENCODED ID CARDS

T. T. WU (Caltech)

Dec. 1979

NPO-13517

Vol. 4, No. 2, p. 172

Hybrid demodulator in electronic card reader for magnetically encoded identification cards, accommodates variations in insertion speeds, yet is simpler and less expensive than equivalent all-digital circuits.

B79-10161

TRANSDUCER WITH A SENSE OF TOUCH

A. K. BEJCZY (Caltech) and G. PAINE (Caltech)

Dec. 1979

NPO-14656

Vol. 4, No. 2, p. 173

Matrix of pressure sensors determines shape and pressure distribution of object in contact with its surface. Output can be used to develop pressure map of objects' surface and displayed as array of alphanumeric symbols on video monitor.

B79-10162

PHOTOCAPACITIVE INFRARED DETECTOR AND SOLAR CELL

R. K. CROUCH, W. E. MILLER, J. A. MORIARTY (College of William and Mary), A. SHER (College of William and Mary), and Y. H. TSUO (College of William and Mary)

Dec. 1979

LANGLEY-12345

Vol. 4, No. 2, p. 174

Lightly doped semiconductor device, with transparent insulating layer based on capacitive response to radiant energy, exhibits excellent sensitivities at room temperature.

B79-10163**OFFSET COMPENSATION FOR A/D CONVERTERS**

S. S. BROKEL (Caltech) and W. J. HURD (Caltech)

Dec. 1979

NPO-13438

Vol. 4, No. 2, p. 176

Analog-to-digital (A/D) converter eliminates dc offset in final digitized signal as well as in analog input by using digital feedback for compensation. Circuit could prove useful in data processing applications in which analog-format data are entered at high rates, as in point-of-sale data input systems.

B79-10164**IMPROVED RIPPLE REJECTION IN A PWM**

C. B. LOFTIS, JR. (Watkins-Johnson Co.)

Dec. 1979

MSC-16923

Vol. 4, No. 2, p. 177

Line-ripple rejection of pulse-width modulator is more than doubled by substituting exponentially increasing ramp voltage for conventional linear ramp, yet circuit is simplified.

B79-10165**DEVELOPMENT OF CMOS INTEGRATED CIRCUITS**

F. BERTINO (RCA Corp.), A. FELLER (RCA Corp.), J. GREENHOUSE (RCA Corp.), T. LOMBARDI (RCA Corp.), A. MERRIAM (RCA Corp.), R. NOTO (RCA Corp.), S. OZGA (RCA Corp.), R. PRYOR (RCA Corp.), P. RAMONDETTA (RCA Corp.), and A. SMITH (RCA Corp.)

Dec. 1979 See also NASA-CR-150801 (N78-78414)

M-FS-25121

Vol. 4, No. 2, p. 178

Report documents life cycles of two custom CMOS integrated circuits: (1) 4-bit multiplexed register with shift left and shift right capabilities, and (2) dual 4-bit registers. Cycles described include conception as logic diagrams through design, fabrication, testing, and delivery.

B79-10294**INDUCTORLESS TUNED CIRCUIT FOR HIGH FREQUENCIES**

L. KLEINBERG

Apr. 1980

GSFC-12410

Vol. 4, No. 3, p. 319

Inductorless tuned circuit functions as filter, amplifier, or oscillator at radio frequencies. Circuit is based on two directly-coupled transistors operated at their transition frequency and fabricated as integrated circuit on single silicon chip.

B79-10295**TEMPERATURE CONTROLLER FOR CRYSTAL RESONATORS**

T. R. TURLINGTON (Westinghouse Electric Corp.)

Apr. 1980

NPO-14507

Vol. 4, No. 3, p. 320

Controller operates on less than 5W prime power and heats crystal from -10 C to 75 C in less than 45s. Unit is faster and more accurate (to within 0.7 C) than other inexpensive controllers and faster and less expensive than very precise controllers in vacuum flasks.

B79-10296**DIRECT-CURRENT DRIVE FOR AC MOTORS**

J. N. SOLARIO (Caltech)

Apr. 1980

NPO-14427

Vol. 4, No. 3, p. 321

Dual windings of ac motor serve as output transformer for dc/ac inversion. Method makes use of low-cost commutatorless ac motors, powered by solar energy, batteries and other dc sources possible.

B79-10297**MEASURING SIGNAL-TO-NOISE RATIO AUTOMATICALLY**

L. A. BERGMAN (Caltech) and A. R. JOHNSTON (Caltech)

Apr. 1980

NPO-14582

Vol. 4, No. 3, p. 322

Automated method of measuring signal-to-noise ratio in digital communication channels is more precise and 100 times faster than previous methods used. Method based on bit-error-rate (B&R)

measurement can be used with cable, microwave radio, or optical links.

B79-10298**LOW-COMMON-MODE DIFFERENTIAL AMPLIFIER**

S. MORRISON (Westinghouse Electric Corp.)

Apr. 1980

MSC-18201

Vol. 4, No. 3, p. 323

Outputs of differential amplifier are excellently matched in phase and amplitude over wide range of frequencies. Common mode feedback loop offsets differences between two signal paths. Possible applications of circuit are in oscilloscopes, integrated circuit logic tester, and other self contained instruments.

B79-10299**BIDIRECTIONAL MANCHESTER REPEATER**

J. FERGUSON (Rockwell International Corp.)

Apr. 1980

MSC-18414

Vol. 4, No. 3, p. 324

Bidirectional Manchester repeater is inserted at periodic intervals along single bidirectional twisted pair transmission line to detect, amplify, and transmit bidirectional Manchester 11 code signals. Requiring only 18 TTL 7400 series IC's, some line receivers and drivers, and handful of passive components, circuit is simple and relatively inexpensive to build.

B79-10300**SOLID-STATE POWER CONTROLLER**

D. A. FOX (Westinghouse Electric Corp.) and J. S. FULLEMANN (Westinghouse Electric Corp.)

Apr. 1980

MSC-16681

Vol. 4, No. 3, p. 325

Compact, solid state, electric-power controller switches power on and off at remote load, limits current drawn by load, and shuts off (with 2- to 3- second trip time) in case of short circuit. Lightweight efficient hybrid unit operates at 28 volts dc and at maximum currents of from 3 to 2 amperes.

B79-10301**VOLTAGE-CONTROLLED ATTENUATOR WITH LOW PHASE SHIFT**

G. F. LUTES, JR. (Caltech)

Apr. 1980

NPO-14347

Vol. 4, No. 3, p. 326

Five megahertz RF (radiofrequency) signal attenuator utilizing RF quadrature hybrid, and optically viable-resistance load controlled by lamp circuit exhibits little phase shift. Circuit is designed to help distribute standard RF signal of controlled amplitude, and phase throughout complex of facilities could be useful in application to precision test equipment and communication electronics.

B79-10302**IMPROVED INSULATOR LAYER FOR MIS DEVICES**

W. E. MILLER

Apr. 1980

LANGLEY-12455

Vol. 4, No. 3, p. 327

Insulating layer of supersonic conductor such as LaF sub 3 has been shown able to impart improved electrical properties to photoconductive detectors and promises to improve other metal/insulator/semiconductor (MIS) devices, e.g. MOSFET and integrated circuits.

B79-10303**MINIMIZING SPIKES IN SWITCHING-REGULATOR CIRCUITS**

W. T. MCCLYMAN (Caltech)

Apr. 1980

NPO-14505

Vol. 4, No. 3, p. 328

Circuit, employing tapped inductor to back-bias rectifying diodes and extra diode to commutate current, minimizes current spikes that cause premature transistor failure in switching-regulator circuits.

B79-10304**DIGITAL AUTOMATIC GAIN CONTROL**

01 ELECTRONIC COMPONENTS AND CIRCUITS

Z. UZDY (Caltech)

Apr. 1980

NPO-14236

Vol. 4, No. 3, p. 329

Performance analysis, used to evaluate fitness of several circuits to digital automatic gain control (AGC), indicates that digital integrator employing coherent amplitude detector (CAD) is best device suited for application. Circuit reduces gain error to half that of conventional analog AGC while making it possible to automatically modify response of receiver to match incoming signal conditions.

B79-10305

SURGE PROTECTION WITH AUTOMATIC RESET

R. B. CHAN (Hughes Aircraft Co.) and M. C. SINELLI (Hughes Aircraft Co.)

Apr. 1980

MSC-18356

Vol. 4, No. 3, p. 329

Circuit turns power off automatically when surge occurs and restores power when voltage returns to normal. Transmitters and other equipment are protected in electrically noisy environments; however, if three transient overvoltages (or continuous overvoltage) are sensed within 3.2 seconds, circuit turns power supply off permanently since serious failure may have occurred.

B79-10306

BUBBLE-DOMAIN DETECTOR

R. L. STERMER and C. D. NICHOLS

Apr. 1980

LANGLEY-12241

Vol. 4, No. 3, p. 330

Bubble domain detector employs transformer coupling for data retrieval. Method makes multidetection practical by time multiplexing. Multiplexer matrices can be scaled in 4 by 4, 4 by 8, 4 by 16, or larger combinations without diode steering.

B79-10307

CMOS ANALOG SWITCHES FOR ADAPTIVE FILTERS

C. E. DIXON (Motorola, Inc.)

Apr. 1980

NPO-14442

Vol. 4, No. 3, p. 332

Adaptive active low-pass filters incorporate CMOS (Complementary Metal-Oxide Semiconductor) analog switches (such as 4066 switch) that reduce variation in switch resistance when filter is switched to any selected transfer function.

B79-10308

MEASURING CHARGE NONUNIFORMITY IN MOS DEVICES

J. MASERJIAN (Caltech) and N. ZAMANI (Caltech)

Apr. 1980

NPO-14585

Vol. 4, No. 3, p. 333

Convenient method of determining inherent lateral charge non-uniformities along silicon dioxide/silicon interface of metal-oxide-semiconductor (MOS) employs rapid measurement of capacitance of interface as function of voltage at liquid nitrogen temperature. Charge distribution is extracted by fast-Fourier-transform analysis of capacitance voltage (C-V) measurement.

B79-10309

VARIABLE-CLOCK-RATE A/D CONVERTER

P. C. LIPOMA (Lockheed Electronics Co.)

Apr. 1980

MSC-18541

Vol. 4, No. 3, p. 333

Analog-to-digital (A/D) converter operates at two different rates (slow and fast) so that low amplitude noise is reduced without loss of transient response. During tracking, when sensitivity is important, slow clock reduces noise. In search mode, when signal may change rapidly, fast clock ensures rapid response.

B79-10310

STRAIN RELIEF FOR POWER-CABLE CONNECTORS

W. T. DEAN, III (Rockwell International Corp.)

Jun. 1980

MSC-19497

Vol. 4, No. 3, p. 334

Easily fabricated grommet composed of polytetrafluoroethylene cylinder, containing U-shaped channels equally spaced around periphery, is used in power cable connectors to

relieve strain on cables. Utilization of grommets provides more ease in cable insertion and removal. Potential applications include wiring in large residential and commercial buildings.

B79-10311

INTERLEAVED SHIELDING FOR CABLES

G. R. READ (Rockwell International Corp.)

Apr. 1980

MSC-18369

Vol. 4, No. 3, p. 335

Interleaved wrapping of metal foil shielding on power cables gives more effective electromagnetic interference protection without increasing amount of material or weight.

B79-10312

ISOLATOR/RETAINER FOR CONNECTORS

J. L. ALPENIA (Rockwell International Corp.) and W. F. ELLIS (Rockwell International Corp.)

Apr. 1980

MSC-18527

Vol. 4, No. 3, p. 335

Double-ended cap holds mating plugs and receptacle, preventing electrical contact between them when not in use. Cap maintains continuous electrical ground between plug and receptacle protecting against electromagnetic-interference pickup. Device is also useful for isolation of sensitive circuits from each other during storage, transit, or testing.

B79-10313

STABLE S-BAND POWER AMPLIFIER

C. E. HERMESMEYER (Motorola, Inc.)

Apr. 1980

NPO-14443

Vol. 4, No. 3, p. 336

Relatively linear amplifier with automatic level control (ALC) preserves modulation characteristics of phase-shift-key (PSK) modulated S-band transmitter.

B79-10314

LIMITING AMPLIFIER FOR MICROWAVES

J. N. OWENS (Hughes Aircraft Co.)

Apr. 1980

MSC-18471

Vol. 4, No. 3, p. 337

Limiting amplifier, using gallium arsenide field effect transistor (FET), delivers constant-amplitude drive signal to KU-band traveling wave tube (TWT) thus preventing distortion in output from TWT.

B79-10315

MOISTURE PENETRATION IN MICROCIRCUIT PACKAGES

J. J. LICARI (Rockwell International Corp.) and K. L. PERKINS (Rockwell International Corp.)

Apr. 1980

M-FS-25087

Vol. 4, No. 3, p. 338

Results of study of hybrid microcircuit packages tested in temperature/humidity environments ranging from 25 C at 98 percent relative humidity (RH) to 85 C at 85 percent RH shows that package susceptibility to moisture is affected more by high temperature than humidity, and room temperature tests are inadequate for testing package seal integrity.

B79-10444

VARIABLE-RESOLUTION COUNTER

J. I. CLEMMONS, JR.

Jun. 1980

LANGLEY-12530

Vol. 4, No. 4, p. 463

Variable-resolution counter circuit increases time interval that n-bit binary counter can measure by using multivalued input clock. Circuit allows measurement of time intervals beyond capability of single n-bit counter while maintaining reasonable resolution.

B79-10445

WINDOW COMPARATOR FOR VOLTAGES

J. M. BLACK

Jun. 1980

FR-10090

Vol. 4, No. 4, p. 464

Circuit determines whether voltage is within preselected range of voltage levels. Device requires fewer components than previous window comparators and is less susceptible to errors from

reference drift. Comparator is useful in process-control circuitry, measuring instruments, and checkout equipment.

B79-10446

LOW-EMI SOLID-STATE RELAY

W. D. MUSKA (United Aircraft Corp.)

Jun. 1980

MSC-12698

Vol. 4, No. 4, p. 465

Solid state relay electromagnetic interference (EMI) generated when switching ac power to load. Relay could find uses in circuits that are particularly susceptible to electrical noise or contain sensitive components.

B79-10447

REAL-TIME DIGITAL INTEGRATOR

A. L. RUBIN (Caltech), H. TAYLOR (Caltech), and D. E. WALLIS (Caltech)

Jun. 1980

NPO-14530

Vol. 4, No. 4, p. 465

Field programmable logic array (FPLA) is used to make 3-bit arithmetic logic unit (ALU) for large integrator that can be read and cleared while new data is added to begin new integral. Arrangement of device can provide for full carry/lookahead capability with minimum gate delays.

B79-10448

BIASED-RECEIVER DIGITAL INTERFACE

F. C. FITZGERALD (IBM Corp.)

Jun. 1980

MSC-14968

Vol. 4, No. 4, p. 466

Coupling circuits converts TTL signals to higher voltage, higher current logic with good noise rejection. Depending on selected components, circuit may also be adapted to low-power applications.

B79-10449

SENSOR/AMPLIFIER FOR WEAK LIGHT SOURCES

D. J. DESMET (Univ. of Alabama), A. J. JASON (Univ. of Alabama), and A. C. PARR (Univ. of Alabama)

Jun. 1980

M-FS-25025

Vol. 4, No. 4, p. 467

Light sensor/amplifier circuit detects weak light converts it into strong electrical signal in electrically noisy environment. Circuit is relatively simple and uses inexpensive, readily available components. Device is useful in such applications as fire detection and photographic processing.

B79-10450

OVERLOAD PROTECTION FOR SWITCHING REGULATORS

E. LACHOCHI (RCA Corp.)

Jun. 1980

MSC-18513

Vol. 4, No. 4, p. 468

Circuit protects all output lines of switching regulator against overloads without requiring current sensors on every line. If overload is sensed, device short circuits bias on switching transistor so that power is rapidly cut off from loads. Circuit also includes delay network to inhibit erroneous operation during startup.

B79-10451

AZIMUTH CORRELATOR DESIGN FOR IC CHIP

V. C. TYREE (Caltech) and C. WU (Caltech)

Jun. 1980

NPO-14614

Vol. 4, No. 4, p. 469

Azimuth correlator circuit synthetic-aperture radar (SAR) is designed for single integrated circuit (IC) chip. Azimuth correlator modules constructed with sets of such chips could make real-time signal processing possible. Primary advantages are realized in areas of weight and power requirement reductions.

B79-10452

RISE-TIME CONTROL IN SATURATED AMPLIFIERS

C. E. THEALL (The Singer Co.)

Jun. 1980

MSC-14934

Vol. 4, No. 4, p. 470

Inductor in transistor emitter circuit controls output rise time of saturated amplifier thereby reducing radiated noise and

distortion in subsequent circuits. Device also improves current balancing in push/pull transformer circuits. Resulting circuits are self compensating for temperature.

B79-10453

LOW-COST, LIGHTWEIGHT RF TRANSFER SWITCH

D. L. OLSSON (TRW, Inc.)

Jun. 1980

MSC-16907

Vol. 4, No. 4, p. 472

Low cost miniature DPDT 'half-size-crystal-can' relay serves as RF transfer switch for 1.0-W S-band signals. Switch can be used in miniature communication equipment operations at vhf-to-microwave frequencies. Device presents principal gains over conventional RF switches on space saving, and weight and cost reduction.

B79-10454

A RELIABLE SOLID-STATE RF TRANSFER SWITCH

R. W. DODD (Watkins-Johnson Co.)

Jun. 1980

MSC-16890

Vol. 4, No. 4, p. 472

Highly-reliable lightweight solid-state RF (radio frequency) transfer switch replaces less reliable mechanical switch in handling medium power for S-band power amplifier.

B79-10455

SEMICONDUCTOR STEP-STRESS TESTING

H. B. MEEKS and F. VILLELLA

Jun. 1980 See also B79-10456 - B79-10475

M-FS-25329

Vol. 4, No. 4, p. 473

Report documents behavior of discrete diodes and transistors in extensive power and temperature overstress tests. Thirty nine devices were tested in groups designated: (1) power overstress, and (2) and (3) temperature overstress. Results are of interest to users of tested components and engineers in conduction of similar tests.

B79-10456

JANTX1N645-1 DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455; B79-10457 - B79-10475

M-FS-25243

Vol. 4, No. 4, p. 474

Samples manufactured by Semtech were tested. Devices showed excessive reverse leakage currents during each of three test phases. Results of testing suggest that failures occurred because of static charge on surface of encapsulant, caused by thermal decomposition of paint.

B79-10457

JANTX1N649-1 DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455; B79-10456; B79-10458; - B79-10475

M-FS-25344

Vol. 4, No. 4, p. 474

Samples manufactured by Semtech and Micro Semiconductor were tested. Both lots did quite well in tests. Plot showing cumulative failure distribution for group 2 was drawn for both lots. Graphs for groups 1 and 3 failures could not be drawn because of extremely low occurrence.

B79-10458

JANTX/N746A DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10457; B79-10459 - B79-10475

M-FS-25245

Vol. 4, No. 4, p. 474

Samples manufactured by Siemens and Motorola were tested. Both lots did well in groups 1 and 3 testing. Failure analysis was done for group 2 tests because of excessive reverse-leakage-current failure mode.

B79-10459

JANTX/N759A VOLTAGE REGULATING DIODE

Innovator not given (Special Products Div. of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10458; B79-

01 ELECTRONIC COMPONENTS AND CIRCUITS

10460 - B79-10475

M-FS-25246

Vol. 4, No. 4, p. 475

Diodes manufactured by Texas Instruments and Siemens performed well in group 1 testing. Failure analysis shows that group 2 testing is most detrimental to both sample lots. Same failure mode of excessive I(sub) R leakage can be clearly seen in group 3 testing.

B79-10460

JANTX/N937B ZENER DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10459; B79-10461 - B79-10475

M-FS-15247

Vol. 4, No. 4, p. 475

Zener diodes manufactured by Motorola and Siemens were tested. Apparent failure mode in all three groups was B (sub) V (Zener-breakdown-voltage) minimum failure. Both manufacturers had approximately same amount of failure in each testing.

B79-10461

JANTX/N972B ZENER DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10460; B79-10462 - B79-10475

M-FS-25248

Vol. 4, No. 4, p. 475

Tested Zeners were manufactured by Siemens and Motorola. Devices tested in groups 1 and 2 did quite well. Notable damage to both manufacturer lots occurred in group 2 testing.

B79-10462

JANTX/N98B ZENER DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10461; B79-10463 - B79-10475

M-FS-25249

Vol. 4, No. 4, p. 475

Tested diodes were manufactured by Motorola and Siemens. Both sample lots performed well in groups 1 and 3 testing. Group 2 testing was most detrimental of three groups. Extreme heat was big factor in failure mode.

B79-10463

JANTX/N1202A SWITCHING DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10462; B79-10464 - B79-10475

M-FS-25250

Vol. 4, No. 4, p. 475

General Electric and International Rectifier switching diodes were tested. Group 2 testing proved to be most damaging to both lots. In group 2 testing many visual failures were seen in samples from both manufacturers.

B79-10464

JANTX1N3893 DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10463; B79-10465 - B79-10475

M-FS-25266

Vol. 4, No. 4, p. 475

Diodes manufactured by Siemens and Motorola were tested. Testing of Motorola diodes was stopped in all 3 groups because 50% failure-rate limit was reached. Siemens lot endured more testing in groups 1 and 2 and completed testing on group 3. Failure analysis was performed for group 2 testing.

B79-10465

JANTX1N4570A ZENER DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10464; B79-10466 - B79-10475

M-FS-25268

Vol. 4, No. 4, p. 475

Siemens and Motorola diodes were tested. Of three stress groups, group 2 prove to be most detrimental to both sample lots.

B79-10466

JANTX1N5415 DIODE

Innovator not given (Special Products Division of DCA Reliability

Lab.) Jun. 1980 See also B79-10455 - B79-10465; B79-10467 - B79-10475

M-FS-25270

Vol. 4, No. 4, p. 476

Tested diodes were manufactured by Semtech and Micro Semiconductor. Micro Semiconductor diodes experienced no failures in groups 2 and 3 testing and only four failures in group 1.

B79-10467

JANTX1N5417 DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10466; B79-10468 - B79-10475

M-FS-25271

Vol. 4, No. 4, p. 476

Tested diodes were manufactured by Micro Semiconductor and Semtech. Significant damage occurred only in group 1 testing.

B79-10468

JANTX1N5420 DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10467; B79-10469 - B79-10475

M-FS-25272

Vol. 4, No. 4, p. 476

Testing of sample lots from Unitrode and Micro Semiconductor had to be stopped in group 1 test because 50% failure rate limit was reached. Failure analysis was performed only for group 2 testing because of apparent failure mode.

B79-10469

JANTX1N5550 SWITCHING DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10468; B79-10470 - B79-10475

M-FS-25273

Vol. 4, No. 4, p. 476

Tested devices were manufactured by Semtech and Micro Semiconductor. Failure rate of Semtech diodes exceeded 50% in all three test groups. Failure mode could not be precisely determined.

B79-10470

JANTX1N5552 SWITCHING DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10469; B79-10471 - B79-10475

M-FS-25274

Vol. 4, No. 4, p. 477

Switching diodes manufactured by Micro Semiconductor and Semtech were tested. In groups 2 and 3 there were no Micro Semiconductor catastrophic failures. Testing of both lots was stopped in group 1 test because of 50% failure rate.

B79-10471

JANTX1N5554 SWITCHING DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10470; B79-10472 - B79-10475

M-FS-25275

Vol. 4, No. 4, p. 477

Micro Semiconductor and Semtech diodes were tested. In group 1 tests Micro Semiconductor and Semtech lot testing was stopped because of excess failure rate. Failure analysis was performed on groups 1 and 3 because of apparent failure mode.

B79-10472

JANTX1N5614 SWITCHING DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10471; B79-10473 - B79-10475

M-FS-25276

Vol. 4, No. 4, p. 477

Diode manufactured by Micro Semiconductor and Semtech were tested. Main failure mode was surface inversions caused by leakage of contaminants through cracks in glass. Most failures in groups 2 and 3 were visual.

B79-10473

JANTX1N5615 SWITCHING DIODE

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10472; B79-

10474 - B79-10475

M-FS-25277

Vol. 4, No. 4, p. 477

Diodes manufactured by Semtech and Micro Semiconductor were tested. Both sample lots exceeded 50% fail-rate in all groups. Failure analysis was performed for groups 2 and 3.

B79-10474**JANTX1N5618 SWITCHING DIODE**

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10473; B79-10475

M-FS-25278

Vol. 4, No. 4, p. 478

Diodes tested were manufactured by Semtech and Micro Semiconductor. Semtech sample lots completed all three testings with only one catastrophic failure. All three Micro Semiconductor lots had several failure that were submitted for failure analysis.

B79-10475**JANTX1N5618 DIODE**

Innovator not given (Special Products Division of DCA Reliability Lab.) Jun. 1980 See also B79-10455 - B79-10474

M-FS-25279

Vol. 4, No. 4, p. 478

Tested diodes were manufactured by Semtech and Micro Semiconductor. Failures were experienced in groups 1 and 2 testing.

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B79-10015**ELECTRONIC PICTURES FROM CHARGED-COUPLED DEVICES**

D. H. MCCANN (Westinghouse Electric Corp.), A. P. TURLY (Westinghouse Electric Corp.), and M. WHITE (Westinghouse Electric Corp.) Aug. 1979

GSFC-12324

Vol. 4, No. 1, p. 17

Imaging system uses charge-coupled devices (CCD's) to generate TV-like pictures with high resolution, sensitivity, and signal-to-noise ratio. It combines detectors for five spectral bands as well as processing and control circuitry all on single silicon chip.

B79-10016**IMPROVING LOW-ILLUMINATION VIDEO**

R. L. SAPIRSTEIN (Lockheed Missiles & Space Co., Inc.) Aug. 1979

MSC-14841

Vol. 4, No. 1, p. 18

Nonmoving TV pictures are improved by electronic system that removes much of the 'snow' or random noise in image. System integrates and averages picture elements in real time and thereby allows easier and more accurate evaluation of image, visually and by computer.

B79-10017**TV AUDIO AND VIDEO ON THE SAME CHANNEL**

J. B. HOPKINS (Westinghouse Electric Corp.) Aug. 1979

MSC-16241

Vol. 4, No. 1, p. 19

Transmitting technique adds audio to video signal during vertical blanking interval. SIVI (signal in the vertical interval) is used by TV networks and stations to transmit cuing and automatic-switching tone signals to augment automatic and manual operations. It can also be used to transmit one-way instructional information, such as bulletin alerts, program changes, and commercial-cutaway aural cues from the networks to affiliates. Additionally, it can be used as extra sound channel for second-language transmission to bilingual stations.

B79-10018**REAL-TIME VIDEO-IMAGE ANALYSIS**

R. ESKENAZI, M. J. RAYFIELD, and Y. YAKIMOVSKY

Aug. 1979

NPO-14282

Vol. 4, No. 1, p. 20

Digitizer and storage system allow rapid random access to video data by computer. RAPID (random-access picture digitizer) uses two commercially-available, charge-injection, solid-state TV cameras as sensors. It can continuously update its memory with each frame of video signal, or it can hold given frame in memory. In either mode, it generates composite video output signal representing digitized image in memory.

B79-10019**ELIMINATING CLUTTER IN SYNTHETIC-APERTURE RADAR**

A. JAIN

Aug. 1979

NPO-14035

Vol. 4, No. 1, p. 21

Diffusion technique reduces clutter noise in coherent SAR (synthetic-aperture radar) image signal without degrading its resolution. Technique makes radar-mapped terrain features more obvious. It also has potential application in holographic microscopy.

B79-10020**AZIMUTH CORRELATOR FOR SYNTHETIC APERTURE RADAR**

W. E. ARENS

Aug. 1979

NPO-14019

Vol. 4, No. 1, p. 22

Azimuth correlation simulates large antenna aperture. It uses charge-coupled-device (CCD) technology to simplify complex, digital, signal-improvement process. In aircraft or spacecraft, correlator processes images onboard and in real time to simplify transmission to ground stations.

B79-10021**SIGNAL SEPARATOR FOR DUAL-FREQUENCY ANTENNA**

R. W. HARTOP

Aug. 1979

NPO-14022

Vol. 4, No. 1, p. 23

Replacement for dichroic plate reduces noise. Besides being easier to install, flange is less expensive to fabricate. Most important, the flange reduces antenna contribution to system noise; whereas, dichroic plate increases noise temperature by 2 or 3 degrees.

B79-10022**COMPONENTS FOR AN S-BAND COMMUNICATION SUBSYSTEM**

C. W. ROOK (Motorola, Inc.)

Aug. 1979

NPO-13955

Vol. 4, No. 1, p. 24

S-band communication components include low-pass filter, diplexer, and transmit output filter, which prevent radiation or coupling of unwanted transmitter spurious outputs and to provide isolation while transmitter and receiver operate simultaneously.

B79-10023**LED DISPLAY FOR SOLO AIRCRAFT INSTRUMENT NAVIGATION**

R. K. CROUCH, W. L. KELLY, VI, L. J. LINA, and B. D. MEREDITH Aug. 1979

LANGLEY-12292

Vol. 4, No. 1, p. 26

Solo pilot's task is made easier through convenient display of landing and navigation data. Use of display shows promise as more efficient means of presenting sequential instructions and data, such as course heading, altitude, and radio frequency, to minimize pilot's workload during solo instrument flight.

B79-10024**CABLE-FAULT LOCATOR**

R. L. CASON, J. J. MCSTAY, and A. P. HEYMANN, SR. (Planning Research Corp.) Aug. 1979

KSC-10899

Vol. 4, No. 1, p. 27

Inexpensive system automatically indicates location of

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short-circuited section of power cable. Monitor does not require that cable be disconnected from its power source or that test signals be applied. Instead, ground-current sensors are installed in manholes or at other selected locations along cable run. When fault occurs, sensors transmit information about fault location to control center. Repair crew can be sent to location and cable can be returned to service with minimum of downtime.

B79-10025

CLOUD-TO-GROUND LIGHTNING DETECTOR

C. L. LENNON

Aug. 1979

KSC-11099

Vol. 4, No. 1, p. 28

Device senses electric-field changes and hf radiation to distinguish cloud-to-ground flashes from cloud-to-cloud flashes.

B79-10026

RELIABLE INVERTER SYSTEMS

S. NAGANO

Aug. 1979

NPO-14163

Vol. 4, No. 1, p. 29

Base driver with common-load-current feedback protects paralleled inverter systems from open or short circuits. Circuit eliminates total system oscillation that can occur in conventional inverters because of open circuit in primary transformer winding. Common feedback signal produced by functioning modules forces operating frequency of failed module to coincide with clock drive so module resumes normal operating frequency in spite of open circuit.

B79-10027

MONITORING DISASTER AREAS VIA SATELLITES

W. E. SIVERTSON, JR.

Aug. 1979

LANGLEY-12344

Vol. 4, No. 1, p. 30

Easily-displayed low-cost radar targets signal distress to orbiting satellites. Effective medical and evacuation efforts can be carried out successfully around globe due to this early warning. Another application is to measure rainfall, surface runoff, evaporation, and soil moisture.

B79-10028

SIMPLER CABLING AND POWER LINK FOR REMOTE READOUTS

J. C. PERRY

Aug. 1979

GSFC-12411

Vol. 4, No. 1, p. 30

Display power and segment data are multiplexed over same coaxial line. Thus, only one wire and return lead are needed, and single power supply at central location can service all remote displays.

B79-10029

A CLOSED-LOOP CONTROL-LOADING SYSTEM

B. R. ASHWORTH and R. V. PARRISH

Aug. 1979 See also NASA-TN-D-8371(N77-16020)

LANGLEY-12167

Vol. 4, No. 1, p. 32

Langley Differential Maneuvering Simulator (DMS) realistically simulates two aircraft operating in differential mode. It consists of two identical fixed-base cockpits and dome projection systems. Each projection system consists of sky/Earth projector and target-image generator and projector. Although programmable control forces are small part of overall system, they play large role in providing pilot with kinesthetic cues.

B79-10030

A TELEPHONE MULTILINE SIGNALING SYSTEM

P. C. TOOLE, J. L. BELT (Planning Research Corp.), R. GOODLOE (Planning Research Corp.), and D. B. LEINIGER (Planning Research Corp.)

Aug. 1979

KSC-11023

Vol. 4, No. 1, p. 33

Telephone system interconnects users of from one to eight telephone lines in network. System is useful in coordinating activities in large plants and installations. It permits spontaneous conferences, paging, and monitoring from key locations.

B79-10031

FADER AND RAMP SHAPER REPLACE LINEAR FILTERS

T. A. ROBINSON (Honeywell, Inc.)

Aug. 1979

MSC-16115

Vol. 4, No. 1, p. 34

Digital 'fader' or 'ramp shaper' circuits replace linear filters in suppressing switching transients and instabilities within servocontrol systems. Circuits can be optimized to introduce no attenuation, transport delay, or phase lags in new output signal.

B79-10032

OPTICAL MEMORIES IN DIGITAL COMPUTING

C. O. ALFORD (Georgia Institute of Technology) and T. K. GAYLORD (Georgia Institute of Technology)

Aug. 1979

M-FS-23897

Vol. 4, No. 1, p. 35

High capacity optical memories with relatively-high data-transfer rate and multipoint simultaneous access capability may serve as basis for new computer architectures. Several computer structures that might profitably use memories are: a) simultaneous record-access system, b) simultaneously-shared memory computer system, and c) parallel digital processing structure.

B79-10166

TELETYPE TEST UNIT

R. H. COUCH and H. C. BEALL (Research Triangle Inst.)

Dec. 1979

LANGLEY-12527

Vol. 4, No. 2, p. 181

Device may be used to facilitate testing and fault isolation in teletype and modem systems that are used for communication by people who having hearing disabilities. Unit uses CMOS digital integrated circuitry which may be operated from relatively inexpensive battery of any voltage from 3 to 18 volts.

B79-10167

LIMITED SCAN DUAL-BAND HIGH-GAIN ANTENNA

P. W. CRAMER, JR. (Caltech) and K. E. WOO (Caltech)

Dec. 1979

NPO-14038

Vol. 4, No. 2, p. 182

Dual band communication and tracking antenna concept combines S- and X-band high gain performance in near field cassagrainian configuration. Design incorporating subreflector in near field of feed permits limited electronic scanning with phased array feed of approximately subreflector size placed in region between subreflector and main reflector.

B79-10168

DUAL HYBRID MODE FEED HORN

D. A. BATHKER (Caltech) and R. F. THOMAS (Caltech)

Dec. 1979

NPO-13594

Vol. 4, No. 2, p. 183

Antenna feed horn is combination of corrugated, round, and tapered waveguide configurations that are dimensioned to excite He sub 11 and He sub 12 modes to illuminate reflector antenna more uniformly than antenna horns excited only in He sub 11 mode. Horn is adaptable to both symmetrical and asymmetrical Cassagrainian antennas.

B79-10169

WIDE-BEAM FLUSH-MOUNTED ANTENNA

H. ELLIS, JR. (Rockwell Intern. Corp.)

Dec. 1979

MSC-16800

Vol. 4, No. 2, p. 184

Compact six-element S-band phased-array antenna produces exceptionally broad, circularly polarized beam and wide bandwidth. Suitable for flush mounting, antennas may be useful in high altitude aircraft, communication satellites, and ground-based moving vehicles.

B79-10170

HIGHER GAIN FOR FEEDBACK CONTROL SUBJECT TO VIBRATIONS

J. F. GARREN, JR. and F. R. NIESSEN

Dec. 1979 See also NASA-TM-X-74004 (N77-17103)

LANGLEY-12215

Vol. 4, No. 2, p. 185

Complementary filtering and simple electronic model greatly increase amount of useful gain achievable in feedback control system subjected to environmental vibration. Technique has increased useful gain from 2 to 4 and increased bandwidth from less than 0.5 Hz to over 1 Hz.

B79-10171

FAULT-TOLERANT COMPUTER SYSTEM

A. A. AVIZIENIS (Caltech), D. A. RENNELS (Caltech), and M. ERCEGOVAC (Caltech)
Dec. 1979

NPO-14562

Vol. 4, No. 2, p. 186

More reliable computers could be assembled by connecting four proposed VSLI 'building block' circuits with built-in error detection to standard microprocessors and memory devices to form self checking computer module. Each building block detects its own malfunctions and single bit errors found in memory.

B79-10172

MAXIMUM-LIKELIHOOD DATA DECODER

M. E. ALBERDA (Caltech)
Dec. 1979

NPO-13574

Vol. 4, No. 2, p. 188

Digital convolutional decoder circuit for data communication receiver employs Viterbi decoding algorithm to quickly and efficiently decode data on basis of 'maximum likelihood' computations.

B79-10173

MICROPROCESSOR-BASED INTERFACE FOR OCEANOGRAPHY

G. R. HANSEN (Caltech)
Dec. 1979

NPO-14566

Vol. 4, No. 2, p. 189

Ocean floor imaging system incorporates five identical microprocessor-based interface units, each assigned to specific sonar instrument to simplify system. Central control module based on same microprocessor eliminates need for custom tailoring hardware interfaces for each instrument.

B79-10174

GUIDANCE SYSTEM FOR A ROVING VEHICLE

J. A. MILLER (Caltech)
Dec. 1979 See also B78-10026

NPO-14376

Vol. 4, No. 2, p. 190

Computer controlled guidance system for semiautonomous robot guides robot in incompletely defined environment. System operates in real time avoiding obstacles detected by 'stereo television and laser range finder eyes.'

B79-10175

MULTIPLE-CAMERA AUTOMATIC CONTROLLER

E. T. BLOAM
Dec. 1979

LEWIS-12711

Vol. 4, No. 2, p. 192

Device automatically controls exposure time and frame sequencing for three remotely located cameras used for photographing interior of internal-combustion chamber through special viewing ports. Controller is highly applicable in many areas where closely monitored remote photography is required.

B79-10176

NAVIGATION-AID POWER SYSTEMS

G. L. GOLTZ (Caltech), L. M. KAISER (Caltech), and H. WEINER (Caltech)
Dec. 1979

NPO-14466

Vol. 4, No. 2, p. 193

Design synthesis and performance analysis (DSP) program package is collection of subroutines used for computation of design and performance characteristics of viable solar-array-charged battery powered system for flashing-lamp buoys employed as maritime aids to navigation.

B79-10316

VIDEO-COMPRESSION SCHEME

H. LUM, JR. and Y. MATSUMOTO

Apr. 1980

ARC-10984

Vol. 4, No. 3, p. 341

Video compression circuit divides picture into elements transmitted at reduced data rate. By sampling elements along diagonals in N-by-N picture blocks, system gives picture quality comparable to that of standard television and superior to most pseudorandom sampling schemes.

B79-10317

ANALOG ACTUATOR-PISTON MEMORY

B. A. SABLE (United Technologies Corp.)
Apr. 1980

MSC-12697

Vol. 4, No. 3, p. 342

Simple analog control system of digitally controlled actuator uses 'stopped' position of actuator as 'memory' and potentiometer as sensing element during power failure to reload drive circuit to value equal to its last position preceding power loss.

B79-10318

MICROPROCESSOR-CONTROLLED RECEIVER

T. L. GRANT and Y. MATSUMOTO
Apr. 1980

ARC-11275

Vol. 4, No. 3, p. 342

Microprocessor and radio receiver are combined in low-cost, high performance, data communications receiver. Hybrid receiver automatically acquires and tracks UHF channels despite low signal-to-noise ratios, fading signal strengths, and high Doppler offset. It also performs digital bit synchronization, which has traditionally required separate unit.

B79-10319

CENTERING IMAGES IN SPLIT-SCREEN TV DISPLAY

J. B. HOPKINS (Westinghouse Elec. Corp.)
Apr. 1980

MSC-18399

Vol. 4, No. 3, p. 343

Circuit for creating 'split screen' television pictures allows operator to select any portion of each image to be displayed without moving cameras.

B79-10320

ALL-DIGITAL QPSK MODULATOR

R. W. BURGESS (Hughes Aircraft Co.) and R. L. JULIAN (Hughes Aircraft Co.)
Apr. 1980

MSC-16922

Vol. 4, No. 3, p. 344

Circuit consisting of only four components (2 IC chips and 2 time delay devices) modulates RF signal with 2 asynchronous digital data signals. Digital modulator is virtually free of amplitude modulation, is not subject to temperature effects from other components, dissipates less power, and is far simpler than its analog predecessors.

B79-10321

LOW-PROFILE COMMUNICATIONS ANTENNA

I. P. YU (Lockheed Electronics Co.)
Apr. 1980

MSC-16683

Vol. 4, No. 3, p. 345

Low profile antenna constructed using microstrip techniques are used for elliptical or circularly polarized signals. Operating range is determined by thickness of dielectric layer and size of antenna element. Compact size and shape along with other desirable features may make antenna useful for communication on trains and other road vehicles.

B79-10322

DUAL-FREQUENCY MICROWAVE ANTENNA

D. A. BATHKER (Caltech), S. A. BRUNSTEIN (Caltech), A. C. LUDWIG (Caltech), and P. D. POTTER (Caltech)
Apr. 1980 See also B79-10021; B79-10002

NPO-13091

Vol. 4, No. 3, p. 346

Single antenna using two feed horns (one for receiving and radiation X-band signals, and one for S-band signals), in conjunction with ellipsoid reflector and dichroic plate, can accommodate two different frequencies simultaneously.

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B79-10323

INTERFEROMETER ANTENNA-ARRAY SYSTEM

J. A. KAISER, JR.

Apr. 1980

GSFC-12385

Vol. 4, No. 3, p. 346

System immune from interference locates signals in space without ambiguity. Signals from each antenna element are processed through three different mixing stages.

B79-10324

LOCK DETECTOR FOR NOISE-CODED SIGNALS

L. M. CARSON (Motorola, Inc.)

Apr. 1980

NPO-14435

Vol. 4, No. 3, p. 348

Circuit indicates when receiver is locked on pseudorandom-noise-coded signal. Circuit is used for reception of such digitally coded signals as scrambled voice messages or scrambled video. Circuit determines when receiver generated code is correct and synchronized with incoming signal so that receiver can track signal.

B79-10476

VARIABLE-RESOLUTION FACSIMILE SYSTEM

P. C. LIPOMA (Lockheed Electronics Co., Inc.)

Jun. 1980

MSC-18516

Vol. 4, No. 4, p. 481

Variable-element scanner in facsimile transmission system allows adjustment of resolution as dictated by document requirement. Device reduces transmission time when high resolution is not needed.

B79-10477

CONSERVING POWER IN COMPUTER MEMORIES

Innovator not given (Honeywell, Inc.) Jun. 1980

LANGLEY-11952

Vol. 4, No. 4, p. 482

Power control system for electronic memories saves energy by switching off power to portions of memories that are not in use. Although power-off period lasts only a few microseconds or milliseconds, it amounts to sizable part of overall read/write cycle timer; large energy savings can be realized.

B79-10478

DIGITAL GENERATION OF COMMAND-ENCODER WAVE-FORMS

W. S. ATARAS (General Electric Co.)

Jun. 1980

GSFC-12203

Vol. 4, No. 4, p. 482

Command encoder for command data system produces sinusoidal signals by purely digital means.

B79-10479

BINARY SYNCHRONOUS SIMULATOR

J. R. ROGERS, III

Jun. 1980

KSC-11096

Vol. 4, No. 4, p. 483

Flexible simulator for trouble-shooting data transmission system uses binary synchronous communications protocol to produce error-free transmission of data between two points. Protocol may be used to replace display generator or be directly fed to display generator.

B79-10480

SWITCHING REDUCES COMPUTER POWER REQUIREMENT

Innovator not given (Honeywell, Inc.) Jun. 1980

LANGLEY-11958

Vol. 4, No. 4, p. 484

Network of power switches activates only selected TTL circuits necessary for that particular time interval. Power that was fed to inactive circuits and dissipated is no longer applied. Because of this, system can use much higher, smaller power source.

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B79-10033

SOLAR-POWERED PUMP

Innovator not given (Calmac Manufacturing Co.) Aug. 1979

M-FS-23996

Vol. 4, No. 1, p. 39

Collector pump of solar-heating systems is powered by concentrating solar collector separate from main collector. Solar driven pump eliminates need for electrical supplies to integral components.

B79-10034

TRANSPARENT SOLAR CELL MODULE

G. J. ANTONIDES (Lockheed Missiles and Space Co.), P. A. DILLARD (Lockheed Missiles and Space Co.), W. M. FRITZ (Lockheed Missiles and Space Co.), and D. P. LOTT (Lockheed Missiles and Space Co.)

Aug. 1979

NPO-14304

Vol. 4, No. 1, p. 40

Modified solar cell module uses high transmission glass and adhesives, and heat dissipation to boost power per unit area by 25% (9.84% efficiency based on cell area at 60 C and 100 mW/sq cm flux). Design is suited for automatic production and is potentially more cost effective.

B79-10035

SOLAR POWER CONDITIONER

L. JAN, N. JOHNSON, S. LINDENA, W. T. MCLYMAN, and J. N. SOLARIO

Aug. 1979

NPO-14356

Vol. 4, No. 1, p. 41

Efficient power-conditioning circuit designed to utilize maximum power available from solar cell array, controls output of array so that excess energy not needed by load is diverted to charge batteries for reserve power when sufficient sunlight is not available.

B79-10036

SUN TRACKER FOR CLEAR OR CLOUDY WEATHER

D. R. SCOTT and P. R. WHITE

Aug. 1979 See also NPO-13652 (B78-10186)

M-FS-23999

Vol. 4, No. 1, p. 42

Sun tracker orients solar collector so that they absorb maximum possible sunlight without being fooled by bright clouds, holes in cloud cover, or other atmospheric conditions. Tracker follows sun within 0.25 deg arc and is accurate within + or - 5 deg when sun is hidden.

B79-10037

ASSEMBLING SOLAR-CELL ARRAYS

J. T. BLOCH (Boeing Co.), R. T. HANGER (Boeing Co.), and F. W. NICHOLS (Boeing Co.)

Aug. 1979

NPO-14416

Vol. 4, No. 1, p. 43

Modified 70 mm movie film editor automatically attaches solar cells to flexible film substrate. Machine can rapidly and inexpensively assemble cells for solar panels at rate of 250 cells per minute. Further development is expected to boost production rate to 1000 cells per minute.

B79-10038

VARIABLE-SHAPE SOLAR-ENERGY CONCENTRATOR

C. G. MILLER (California Polytechnic State Univ. of San Luis Obispo, Calif.) and J. H. PHOL (California Polytechnic State Univ. of San Luis Obispo, Calif.)

Aug. 1979

NPO-13736

Vol. 4, No. 1, p. 43

Proposed low cost three dimensional tracking solar concentrator fabricated from lightweight, flexible polymeric film membrane is controlled in shape by differential pressure loading. Fine adjustments to shape could be made by mounting electrets or magnets on membrane or applying electric or magnetic field.

B79-10039**ALL-ELECTRIC GAS DETECTOR**

J. S. MARGOLIS

Aug. 1979

NPO-14341

Vol. 4, No. 1, p. 45

Modified optoacoustic gas detector identifies gases by measuring pressure-induced voltage change in electric signals. It can detect water vapor, atmospheric fluorocarbons, or certain nitrous or nitric compounds that indicate presence of explosives.

B79-10040**LOW-NOISE SPECTROPHONE**

M. J. KAVAYA and J. S. MARGOLIS

Aug. 1979

NPO-14362

Vol. 4, No. 1, p. 46

Spectrophone, using continuous laser beam, operates at lower noise levels and thus detects trace amounts of gases with greater sensitivity.

B79-10041**IMPROVED COAL-SLURRY PIPELINE**

W. L. DOWLER

Aug. 1979

NPO-14425

Vol. 4, No. 1, p. 47

High strength steel pipeline carries hot mixture of powdered coal and coal derived oil to electric-power-generating station. Slurry is processed along way to remove sulfur, ash, and nitrogen and to recycle part of oil. System eliminates hazards and limitations associated with anticipated coal/water-slurry pipelines.

B79-10042**FUEL GAS FROM BIODIGESTION**

R. C. McDONALD (National Space Tech. Laboratory) and B. C. WOLVERTON (National Space Tech. Laboratory)

Aug. 1979

M-FS-23957

Vol. 4, No. 1, p. 48

Biodigestion apparatus produces fuel gas (primarily methane) for domestic consumption, by anaerobic bacterial digestion of organic matter such as aquatic vegetation. System includes 3,786-1 cylindrical container, mechanical agitator, and simple safe gas collector for short term storage.

B79-10043**OPTICALLY COUPLING TUNABLE DIODE LASERS**

D. M. ROBINSON and C. W. ROWLAND

Aug. 1979

LANGLEY-12438

Vol. 4, No. 1, p. 49

Proposed optical coupling, using lenses and mirrors that replace complex mechanical systems, can combine separate tunable diode laser outputs and expand wavelength range. Method uses single cooler housing and requires no moving parts within cooler assembly.

B79-10044**IMPROVED FLIGHT-SIMULATOR VIEWING LENS**

W. M. KAHLBAUM

Aug. 1979 See also NASA-TP-1066 (N78-12829)

LANGLEY-12251

Vol. 4, No. 1, p. 50

Triplet lens system uses two acrylic plastic double convex lenses and one polystyrene plastic single convex lens to reduce chromatic distortion and lateral aberration, especially at large field angles within in-line systems of flight simulators.

B79-10045**PROJECTION OPTICS FOR A LASER VELOCIMETER**

D. B. RHODES

Aug. 1979

LANGLEY-12328

Vol. 4, No. 1, p. 51

Projection optics for laser velocimeter (LV) scans constant focal volume over entire focus-position range. Optics thus simplify LV measurements over large flow fields (such as those encountered in wind tunnels) by eliminating calibrations required when focal volume varies with position.

B79-10046**A CHEVRON BEAM-SPLITTER INTERFEROMETER**

J. B. BRECKINRIDGE

Aug. 1979

NPO-14502

Vol. 4, No. 1, p. 51

Fully tilt compensated double-pass chevron beam splitter, that removes channelling effects and permits optical phase tuning, is wavelength independent and allows small errors in alignment that are not tolerated in Michelson, Machzender, or Sagnac interferometers. Device is very useful in experiments where background vibration affects conventional interferometers.

B79-10047**OPTICAL SYSTEM FOR MULTISPECTRAL SCANNER**

R. C. STOKES and N. G. KOCH (Lockheed Electronics Co.)

Aug. 1979

MSC-18255

Vol. 4, No. 1, p. 52

Optical system designed for scanning eight spectra bands simultaneously from aircraft at variety of speeds and altitudes is compact, easy to align, and reliable. System efficiently and effectively circumvents many problems associated with previous systems.

B79-10048**MARINE CHLOROPHYLL A ANALYSIS**

R. W. JOHNSON

Aug. 1979 See also NASA-TP-1021 (N78-13628)

LANGLEY-12293

Vol. 4, No. 1, p. 54

Quantitative distribution maps of chlorophyll a and other important environmental parameters of coastal zones are prepared by regression analysis of sea-truth data and data collected by aircraft multispectral scanners.

B79-10049**PRODUCTION OF LARGE-AREA ELECTRETS**

P. K. C. PILLAI, E. SHIVERS, and O. WEAVER

Aug. 1979

M-FS-23186

Vol. 4, No. 1, p. 55

Charge injection techniques are used in two methods of producing low cost homocharged electrets.

B79-10050**THEORY OF BACK-SURFACE-FIELD SOLAR CELLS**

O. VONROOS

Aug. 1979

NPO-14451

Vol. 4, No. 1, p. 57

Report describes simple concise theory of back-surface-field (BSF) solar cells (npp + junctions) based on Shockley's depletion-layer approximation and cites superiority of two-junction devices over conventional unijunction cells.

B79-10051**RANKINE-CYCLE SOLAR-COOLING SYSTEMS**

H. M. WEATHERS

Aug. 1979

M-FS-25094

Vol. 4, No. 1, p. 57

Report reviews progress made by three contractors to Marshall Space Flight Center and Department of Energy in developing Rankine-cycle machines for solar cooling and testing of commercially available equipment involved.

B79-10052**RANKINE-CYCLE HEATING AND COOLING SYSTEMS**

Innovator not given (AiResearch Manufacturing Co.) Aug. 1979

M-FS-23998

Vol. 4, No. 1, p. 58

Design for domestic or commercial solar heating and cooling system based on Rankine heat pump cycle includes detailed drawings, performance data, equipment specifications, and other pertinent information.

B79-10053**DESIGN INFORMATION FOR SOLAR-HEATING SYSTEMS**

Innovator not given (Colt, Inc.) Aug. 1979

M-FS-25097

Vol. 4, No. 1, p. 58

Report contains preliminary design information for two solar-heating and hot water systems presently under development. Information includes quality control data, special tooling specifica-

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tions, hazard analysis, and preliminary training program for installation contractors.

B79-10054

SOLAR-HEATING SYSTEM-PERFORMANCE TESTS

Innovator not given (IBM Federal Systems Div.) Aug. 1979 See also M-FS-25022 (B78-10494)

M-FS-25116

Vol. 4, No. 1, p. 58

Report describes comprehensive performance tests of complete solar powered space and hot water heating system to verify its suitability for field installation in small single family dwellings.

B79-10055

PERFORMANCE TEST FOR A SOLAR WATER HEATER

Innovator not given (Wyle Labs., Inc.) Aug. 1979

M-FS-25114

Vol. 4, No. 1, p. 59

Two reports describe procedures and results of performance tests on domestic solar powered hot water system. Performance tests determine amount of energy collected by system, amount of energy delivered to solar source, power required to operate system and maintain proper tank temperature, overall system efficiency, and temperature distribution in tank.

B79-10056

AIR SOLAR COLLECTOR-INSTALLATION PACKAGE

Innovator not given (Owens-Illinois, Inc.) Aug. 1979

M-FS-25031

Vol. 4, No. 1, p. 59

Installation package for air solar collector contains parts list, operating instructions, and performance specifications.

B79-10057

STATIC LOAD TESTING OF A LIQUID SOLAR COLLECTOR

Innovator not given (Wyle Labs., Inc.) Aug. 1979 See also M-FS-23890 (B78-10208)

M-FS-25115

Vol. 4, No. 1, p. 59

Report summarizes results of tests in which flat-plate liquid solar collectors were subjected to static pressure loads and examined for leakage and other damage.

B79-10058

LIQUID SOLAR COLLECTOR-PERFORMANCE EVALUATION

Innovator not given (Wyle Labs., Inc.) Aug. 1979 See also M-FS-25010 (B78-10498); M-FS-25082 (B78-10499)

M-FS-25090

Vol. 4, No. 1, p. 59

Report summarizes thermal performance tests and measurements of incident-of-angle modified and transient response of flat-plate solar collector.

B79-10059

WEATHERING OF A LIQUID-FILLED SOLAR COLLECTOR

Innovator not given (Wyle Labs., Inc.) Aug. 1979 See also M-FS-23972 (B78-10477)

M-FS-25113

Vol. 4, No. 1, p. 60

Report describes procedures and results of tests for effects of weathering on flat-plate liquid solar collector. Thermal performance was measured before and after natural weathering for 15-1/2 months by using Marshall Space Flight solar simulator.

B79-10060

DESIGN OF A CONCENTRATING SOLAR COLLECTOR

Innovator not given (Northrop, Inc.) Aug. 1979

M-FS-25098

Vol. 4, No. 1, p. 60

Design package for concentrating solar collector includes detailed set of design drawings and parts list for all components and subcomponents of system (including its tracking drive).

B79-10061

CONCENTRATING SOLAR COLLECTOR-PERFORMANCE TESTS

Innovator not given (Wyle Labs., Inc.) Aug. 1979 See also M-FS-25068 (B78-10500)

M-FS-25086

Vol. 4, No. 1, p. 60

Report summarizes test results from evaluation of concentrating solar collector thermal performance, from transient behavior,

and incident-of-angle behavior. Tests were conducted using National Bureau of Standards recommendations and specifications.

B79-10062

CONTROLLER FOR SOLAR HEATING-DESIGN PACKAGE

Innovator not given (Solar Control Corp.) Aug. 1979

M-FS-25009

Vol. 4, No. 1, p. 61

Report contains performance specifications and detailed drawings for two instruments: (1) differential controller, and (2) temperature monitor, for solar-powered water-heating systems. Included in package are schematics, wiring diagrams, test procedures, and parts list.

B79-10063

COST ANALYSIS OF HOT-AIR SOLAR-HEATING SYSTEMS

B. J. HAWKINS and R. D. STEWART

Aug. 1979

M-FS-25092

Vol. 4, No. 1, p. 62

Report describes results of study of two operational test sites (Huntsville, Alabama and Carlsbad, New Mexico) furnishing estimates of actual costs and potential cost savings of new and retrofit hot-air solar heating and hot-water system for single family dwellings.

B79-10064

SOLAR ENERGY FOR INDUSTRIAL PROCESS HEAT

R. H. BARBIERI and D. L. PIVROTTO

Aug. 1979

NPO-14498

Vol. 4, No. 1, p. 62

Findings of study of potential use for solar energy utilization by California dairy industry prove that applicable solar energy systems furnish much of heat needed for milk processing with large savings in expenditures for oil and gas and ensurance of adequate readily available sources of process heat.

B79-10065

AN ANNOTATED ENERGY BIBLIOGRAPHY

S. J. BLOW

Aug. 1979 See also NASA-TM-74764 (N77-28578); NASA-TM-47465 (N77-28577)

LANGLEY-12488

Vol. 4, No. 1, p. 62

Comprehensive annotated compilation of books, journals, periodicals, and reports on energy and energy related topics, contains approximately 10,000 technical and nontechnical references from bibliographic and other sources dated January 1975 through May 1977.

B79-10066

ANALYSIS OF APERTURE ANTENNA RADIATION PATTERN

R. HERSKIND (AVCO Corp.), E. SAYRE (AVCO Corp.), J. E. TROUSDALE (AVCO Corp.), and J. YOS (AVCO Corp.)

Aug. 1979

MSC-16246

Vol. 4, No. 1, p. 63

Report presents analysis of radiation pattern produced by aperture antenna transmitting through layered dielectric material. Report also describes computer program developed to compute radiation patterns on basis of analysis.

B79-10067

ANALYSIS OF BUILDING HEATING AND COOLING

V. W. CHAI, S. HIGGINS, F. L. LANSING, F. W. STOLLER, and D. M. STRAIN

Aug. 1979

NPO-14683

Vol. 4, No. 1, p. 63

Energy Conservation Program (ECP) gives design engineer methodology and easy-to-use computer program for simulating hourly thermal characteristics over full year for individually characterized zones within building. Inexpensive system can be used to develop thermal model of building to aid selection of most suitable and economical heating and cooling system for building.

B79-10177

SINGLE-AXLE, DOUBLE-AXIS SOLAR TRACKER

L. W. BRANTLEY and B. D. LAWSON

Dec. 1979

M-FS-23267**Vol. 4, No. 2, p. 197**

Solar concentrator tracking mechanism consisting of angular axle and two synchronized drive motors, follows seasonal as well as diurnal changes in Earth's orientation with respect to incoming sunlight.

B79-10178**HIGH-PERFORMANCE SOLAR COLLECTOR**

D. C. BEEKLEY (Owens-Illinois, Inc.) and G. R. MATHER, JR. (Owens-Illinois, Inc.)

Dec. 1979

M-FS-25135**Vol. 4, No. 2, p. 198**

Evacuated all-glass concentric tube collector using air or liquid transfer mediums is very efficient at high temperatures. Collector can directly drive existing heating systems that are presently driven by fossil fuel with relative ease of conversion and less expense than installation of complete solar heating systems.

B79-10179**SIMPLE, ECONOMICAL SOLAR COLLECTOR**

K. ANTHONY

Dec. 1979 See also B78-10203

M-FS-25109**Vol. 4, No. 2, p. 199**

Hot air solar collector designed for economy and simplicity is assembled from only three parts: (1) molded urethane foam body, (2) flat sheet metal collector panel and (3) transparent cover. Large arrays may be assembled by inserting male fittings of each collector into female fitting of adjacent collector.

B79-10180**LIGHTWEIGHT, ECONOMICAL SOLAR CONCENTRATOR**

J. G. SIMPSON

Dec. 1979

M-FS-23727**Vol. 4, No. 2, p. 200**

Concentrator consisting of aluminized polymeric film stretched over parallel tensioned wires that can be used with or without tracking drive promises to reduce cost of commercial and residential solar heating systems.

B79-10181**POINTING ERRORS IN SOLAR DISH COLLECTORS**

R. O. HUGHES (Caltech)

Dec. 1979

NPO-14630**Vol. 4, No. 2, p. 200**

Mathematical analysis calculates effects of transient pointing errors in solar dish collectors treating each pointing error separately. This approach considerably simplifies programming of simulation models for tracking drive, wind effects, and other design parameters.

B79-10182**DIFFERENTIAL SPECTROPHONE**

J. S. MARGOLIS (Caltech)

Dec. 1979 See also B78-10167; B79-10040

NPO-14599**Vol. 4, No. 2, p. 202**

Sensitivity and measuring capability of optoacoustic gas analyzer (spectrophone) are enhanced by combining differential monitoring stark modulation.

B79-10183**LENS WINDOW SIMPLIFIES TDL HOUSING**

D. M. ROBINSON and C. W. ROWLAND

Dec. 1979

LANGLEY-12437**Vol. 4, No. 2, p. 203**

Lens window seal in tunable-diode-laser housing replaces plan parallel window. Lens seals housing and acts as optical-output coupler, thus eliminating need for additional reimaging or collimating optics.

B79-10184**FOCUSING LASER SCANNER**

W. R. CALLEN (Georgia Inst. of Technology) and J. E. WEAVER (Georgia Inst. of Technology)

Dec. 1979 See also NASA-CR-150810 (N78-31412)

M-FS-25102**Vol. 4, No. 2, p. 204**

Economical laser scanner assembled from commercially available components, modulates and scans focused laser beam over area up to 5.1 by 5.1 cm. Scanner gives resolution comparable to that of conventional television. Device is highly applicable to area of analog and digital storage and retrieval.

B79-10185**MULTIPLEXED MASS SPECTROMETER FOR DESORPTION STUDIES**

M. BALES (California Univ., Berkeley)

Dec. 1979

ARC-11134**Vol. 4, No. 2, p. 205**

Microprocessor controlled mass spectrometer data acquisition system simultaneously monitors up to nine gaseous products emitted from heated substrate during thermal desorption experiments.

B79-10186**PREIONIZED DISCHARGE FOR SHORT-WAVELENGTH LASER**

J. B. LAUDENSLAGER (Caltech) and T. J. PACALA (Caltech)

Dec. 1979 See also B75-10115

NPO-13945**Vol. 4, No. 2, p. 206**

Laser uses helium and nitrogen gases at pressure of several atmospheres to produce emissions in visible and ultraviolet regions. Preionization of gases by transverse discharge insures that main discharge is glow instead of arc for proper charge transfer mechanism.

B79-10187**IMPROVED TIME-OF-FLIGHT MASS SPECTROMETER**

K. A. LINCOLN

Dec. 1979

ARC-11090**Vol. 4, No. 2, p. 207**

External signal-conditioning electronics assembled from commercially available components improves dynamic capability of time-of-flight mass spectrometer.

B79-10188**DEGASSING PROCEDURE FOR ULTRAHIGH VACUUM**

B. C. MOORE (McDonnell Douglas Corp.)

Dec. 1979

M-FS-25103**Vol. 4, No. 2, p. 208**

Calculations based on diffusion coefficients and degassing rates for stainless-steel vacuum chambers indicate that baking at lower temperatures for longer periods give lower ultimate pressures than rapid baking at high temperatures. Process could reduce pressures in chambers for particle accelerators, fusion reactors, material research, and other applications.

B79-10189**PERFORMANCE EVALUATION OF A LIQUID SOLAR COLLECTOR**

Innovator not given (Wyle Laboratories) Dec. 1979

M-FS-25026**Vol. 4, No. 2, p. 209**

Report describes thermal performance and structural-load tests on commercial single glazed flat-plate solar collector with gross area of 63.5 sq ft that uses water as heat-transfer medium. Report documents test instrumentation and procedures and presents data as tables and graphs. Results are analyzed by standard data-reduction methods.

B79-10190**DESIGN AND INSTALLATION OF A SOLAR-POWERED HOT-WATER SYSTEM**

Innovator not given (Solar Engineering & Manufacturing Co.) Dec. 1979

M-FS-25080**Vol. 4, No. 2, p. 209**

Package includes performance specifications, design drawings, hazard analysis, and installation for complete solar-powered hot-water system.

B79-10191**THE DESIGN OF SOLAR-HEATING SYSTEMS**

Innovator not given (Honeywell, Inc.) Dec. 1979

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M-FS-25108

Vol. 4, No. 2, p. 209

Report describes organized approach to design of solar-heating systems. Such parameters as collector area, storage capacity, hardware, and constraints are determined and complete cost-and-performance analysis are made. Report provides practical example by tracing development of several systems sized for single family, multifamily, and commercial buildings in Minneapolis area.

B79-10192

THE DESIGN OF SOLAR-HEATING AND COOLING SYSTEMS

Innovator not given (Honeywell, Inc.) Dec. 1979

M-FS-25106

Vol. 4, No. 2, p. 210

Methods described in report were used to develop specifications for Rankine-cycle solar heating and cooling systems for single family, multifamily, and commercial buildings.

B79-10193

DESIGN PACKAGE FOR A SOLAR-HEATING SYSTEM

Innovator not given (IBM Corp.) Dec. 1979 See also B78-10492; B78-10493

M-FS-25136

Vol. 4, No. 2, p. 210

Report contains sufficient information to assemble complete tested residential flat-plate solar heating system. Descriptive material provides design, performance, and hardware specifications for utilization by architectural engineers, and contractors in procurement, installation, operation, and maintenance of similar solar applications.

B79-10194

PERFORMANCE AFTER WEATHERING OF A LIQUID SOLAR COLLECTOR

Innovator not given (Wyle Laboratories) Dec. 1979 See also B78-10206

M-FS-25137

Vol. 4, No. 2, p. 211

Results from retesting of liquid solar collector described in 'Performance evaluation of liquid collector' (M-FS-23931), after long term exposure to natural weathering indicate no detectable degradation in collector performance and no visible deterioration in appearance of collector. Supporting data and pretest/post test efficiency comparison are included.

B79-10195

MODULAR SOLAR-HEATING SYSTEM - DESIGN PACKAGE

D. S. SINTON (IBM Corp.)

Dec. 1979 See also B78-10494

M-FS-25130

Vol. 4, No. 2, p. 211

Compilation contains design, performance, and hardware specifications in sufficient detail to fabricate or procure materials and install, operate, and maintain complete modular solar heating and hot water system for single family size dwellings.

B79-10196

CONCENTRIC-TUBE SOLAR COLLECTOR

Innovator not given (Owens-Illinois) Dec. 1979 See also B79-10056

M-FS-25133

Vol. 4, No. 2, p. 211

Brochure contains design, performance, and installation information for commercial concentric-tube solar collector.

B79-10197

PERFORMANCE VERIFICATION OF AN AIR SOLAR COLLECTOR

D. C. MILLER (Owens-Illinois) and R. F. ROMAKER (Owens-Illinois)

Dec. 1979 See also B79-10056

M-FS-25131

Vol. 4, No. 2, p. 212

Procedures and results of battery of qualification tests performed by independent certification agency on commercial solar collector are presented in report. Reported results were used as basis in judging collector suitable for field installation in residential and commercial buildings.

B79-10198

PRELIMINARY DESIGN OF AN AIR SOLAR COLLECTOR

Innovator not given (Owens-Illinois) Dec. 1979

M-FS-25138

Vol. 4, No. 2, p. 212

Report containing performance specifications and engineering drawings of concentric-tube air solar collector show details of collector and subcomponents that indicate efficiency surpassing predetermined performance baseline for air collectors.

B79-10199

DESIGN REVIEW OF A LIQUID SOLAR COLLECTOR

B. L. WIESEWMAIER

Dec. 1979

M-FS-25140

Vol. 4, No. 2, p. 212

Report documents procedures, results, and recommendations for in-depth analysis of problems with liquid-filled version of concentric-tube solar collector. Problems are related to loss of vacuum and/or violent fracture of collector elements, fluid leakage, freezing, flow anomalies, manifold damage, and other component failures.

B79-10200

DEVELOPMENT OF NONMETALLIC SOLAR COLLECTOR AND SOLAR-POWERED PUMP

J. C. PARKER

Dec. 1979 See also B78-10498; B78-10499; B79-10033

M-FS-25143

Vol. 4, No. 2, p. 213

Design and building of two unique components for solar heating 1. flatplate solar collector using no metal components, and 2. solar powered pump for heating and cooling systems are outlined in report. Report also discusses hardware, deliverable end items, problems encountered during fabrication and testing, and performance certification.

B79-10201

CERTIFICATION TESTS ON THE SOLAR-POWERED PUMP

Innovator not given (Calmac Manufacturing Co.) Dec. 1979 See also B79-10200

M-FS-25144

Vol. 4, No. 2, p. 213

Evaluation of solar-powered pump is given. Details cover fifty performance criterion along with summary of findings.

B79-10202

COST-REDUCTION ANALYSIS FOR A SOLAR-HEATING SYSTEM

W. L. REID (Alabama Univ.) and R. E. SHANNON (Alabama Univ.)

Dec. 1979 See also B79-10063

M-FS-25152

Vol. 4, No. 2, p. 213

Details on solar-heating system installed in Huntsville, Alabama are presented. Estimated cost savings and recommendations for system are proposed.

B79-10203

REMOTE-SENSING APPLICATIONS TO GEOLOGY

Innovator not given (University of Tennessee Space Institute) Dec. 1979

M-FS-25151

Vol. 4, No. 2, p. 214

Results of two day workshop on applications of remote sensing to geology are summarized in report. Topics discussed are environmental analysis, crop classification, plant epidemics and diseases, irrigation reform, and soil surveys.

B79-10204

COMPUTER ANALYSIS OF LANDSAT DATA

R. R. JAYROE, JR.

Dec. 1979 See also NASA-TM-78184 (N78-30634)

M-FS-25105

Vol. 4, No. 2, p. 214

Report summarizing possible ways of improving LANDSAT data provided by computers is presented.

B79-10205

SKYMAP STAR CATALOG

D. GOTLIEB (Computer Science Corp.)

Dec. 1979

GSFC-12445

Vol. 4, No. 2, p. 215

Skymap data and data-handling programs for 255,000 stars are discussed. Data should prove useful to astronomers, spacecraft

designers, and others who have need for comprehensive star catalog.

B79-10206

METEOROLOGICAL DATA-PROCESSING PACKAGE

J. B. BILLINGSLEY and P. A. BRAKEN

Dec. 1979

GSFC-12372

Vol. 4, No. 2, p. 215

METPAK, meteorological data-processing package of satellite data used to develop cloud-tracking maps, is given. Data can develop and enhance numerical prediction models for mesoscale phenomena and improve ability to detect and predict storms.

B79-10207

AOIPS CLASSIFICATION PACKAGE

J. B. BILLINGSLEY and P. A. BRAKEN

Dec. 1979

GSFC-12374

Vol. 4, No. 2, p. 216

CLASSPAK, interactive program for classifying multispectral data, is presented. Program is applicable in land-cover studies, forestry and agriculture investigations, and also for watershed studies.

B79-10325

TRANSMITTER/RECEIVER FOR LASER IMAGING

P. G. HASELL, JR. (Environmental Research Institute of Michigan),

L. M. LARSEN (Environmental Research Institute of Michigan),

and E. A. WORK (Bureau of Land Management)

Apr. 1980 See also NASA-CR-151461 (N77-27485)

MSC-18196

Vol. 4, No. 3, p. 351

Dual-mirror transmitter and receiver combination is used with laser multispectral imaging system carried by low fly aircraft. Device can be arranged to reduce laser light backscatter which creates false light levels in recorded image and compensates for scanning phase delay between transmitter and receiver.

B79-10326

FABRICATING WEDGE-SHAPED BEAM SPLITTERS

C. M. FLEETWOOD, JR. and S. H. RICE

Apr. 1980

GSFC-12348

Vol. 4, No. 3, p. 352

Fast economical fabrication produces wedge-shaped beam splitter with 0.3 micrometer edge, compared to conventional methods that have yielded 2 micrometer edges. Typical beam splitter made by new process is prism-shaped with right-triangle cross-section.

B79-10327

FIELD-FLATTENER LENS

F. VICIK (Barnes Engineering Co.)

Apr. 1980 See also NASA-CR-151753 (N78-29424)

MSC-18373

Vol. 4, No. 3, p. 353

Proposed spherical lens employs image flattening reflective surface within spherical refracting elements to focus light to flat image. Device is intended for use as optical scanner for silicon light detector. Lens can scan wide angle at low F-stops, producing high-resolution image over angle of wavelengths from 0.4 to 14 micrometers.

B79-10328

HIGH-RESOLUTION SPECTROMETER

R. BEER (Caltech)

Apr. 1980

NPO-14372

Vol. 4, No. 3, p. 354

Proposed spectrometer combines optical and imaging devices and cryogenic cooling to measure infrared radiation in 1-to-15 micrometer wavelength range with spatial resolution of 1 arc-second and average spectral resolution of about 0.1 cm⁻¹. Compact, lightweight unit is suitable for laboratory or field use. Pollution monitoring is possible application.

B79-10329

LIQUID/LIQUID HEAT EXCHANGER

C. G. MILLER (Caltech)

Apr. 1980

NPO-14271

Vol. 4, No. 3, p. 355

Conceptual design for heat exchanger, utilizing two immiscible liquids with dissimilar specific gravities in direct contact, is more efficient mechanism of heat transfer than conventional heat exchangers with walls or membranes. Concept could be adapted for collection of heat from solar or geothermal sources.

B79-10330

NO-REHEAT AIR-CONDITIONING

H. D. OBLER

Apr. 1980

GSFC-12191

Vol. 4, No. 3, p. 356

Air conditioning system, for environmentally controlled areas containing sensitive equipment, regulates temperature and humidity without wasteful and costly reheating. System blends outside air with return air as dictated by various sensors to ensure required humidity in cooled spaces (such as computer room).

B79-10331

IMPROVING MASER FREQUENCY STABILITY

S. B. CRAMPTON (Williams College)

Apr. 1980

GSFC-12400

Vol. 4, No. 3, p. 357

Hydrogen maser frequency standard is more stable by addition of parallel pyrex capillary tube array collimator. With collimator, maser line width has been made as narrow as 0.24 hertz representing fivefold improvement over maser without collimator. Fluorocarbon coating in tubes virtually eliminates energy loss in collimator.

B79-10332

ROTATABLE MICROSCOPE STAGE

J. A. IVANISKO (Sperry Rand Corp.)

Apr. 1980

MSC-18549

Vol. 4, No. 3, p. 358

Samples mounted on rotatable microscope stage consisting of aluminum hemisphere resting in hemispherical cavity of polytetrafluoroethylene base is viewed at various angles. Stage permits operator to orient sample at selected fixed angles.

B79-10333

MICROWAVE MEASUREMENT OF ATMOSPHERIC PRESSURE

D. A. FLOWER (Caltech) and G. E. PECKHAM (Heriot-Watt University)

Apr. 1980

NPO-14450

Vol. 4, No. 3, p. 358

Proposed concept for measuring surface air pressure over ocean utilizes three pairs of microwave signals transmitted from orbiting satellite. Measurements are used for long range weather forecasting.

B79-10334

ALL-GLASS SOLAR COLLECTOR

J. P. WISNEWSKI (PPG Industries, Inc.)

Apr. 1980

M-FS-23870

Vol. 4, No. 3, p. 359

Proposed all tempered glass solar collector uses black collection fluid and mirrored bottom to reduce energy loss and overall costs associated with conventional collectors. Collector is more efficient and practically maintenance-free.

B79-10335

SOLAR-HEATING SYSTEM DESIGN PACKAGE

Innovator not given (Contemporary Systems, Inc.) Apr. 1980

M-FS-25226

Vol. 4, No. 3, p. 360

Report describes solar heating system composed of warm-air solar collector, logic control unit, and switching and transport unit, that meets government standards for installation in residential dwellings. Text describes system operation and performance specifications complemented by comprehensive set of subcomponent design drawings.

B79-10336

TEST AND EVALUATION OF A SOLAR-HEATING SYSTEM

03 PHYSICAL SCIENCES

Innovator not given (Fern Engineering Co., Inc.) Apr. 1980
M-FS-25201 Vol. 4, No. 3, p. 360

Report documents results of evaluation tests performed on components of commercial solar heating and hot water system. Subsystems tested include flat plate solar collector, energy transport module, and control panel. Tests conducted include snow and wind loads, flame spread, and smoke classification as well as solar heating operation.

B79-10337 INSTALLATION PACKAGE FOR A SOLAR-HEATING SYSTEM

Innovator not given (Solaron Corp.) Apr. 1980
M-FS-25199 Vol. 4, No. 3, p. 360

Package consists of installation, operation and maintenance manuals for four commercial solar energy subsystems, including flat plate solar collector pebble bed thermal-storage. Manual gives design information, sizing data, specification drawings, and other material for subsystem.

B79-10338 VERIFICATION TESTS FOR A SOLAR-HEATING SYSTEM

Innovator not given (Colt, Inc.) Apr. 1980
M-FS-25178 Vol. 4, No. 3, p. 361

Report describes method of verification of solar space heating and hot-water systems using similarity comparison, mathematical analysis, inspections, and tests. Systems, subsystems, and components were tested for performance, durability, safety, and other factors. Tables and graphs complement test materials.

B79-10339 RESIDENTIAL SOLAR-HEATING/COOLING SYSTEM

Innovator not given (Energy Resources Center of Honeywell, Inc.) Apr. 1980 See also B79-10192

M-FS-25166 Vol. 4, No. 3, p. 361

Report documents progress of residential solar-heating and cooling system development program at 5-month mark of anticipated 17-month program. System design has been completed, and development and component testing has been initiated. Report includes diagrams, operation overview, optimization studies of subcomponents, and marketing plans for system.

B79-10340 INSTALLATION PACKAGE FOR A SOLAR-HEATING SYSTEM

Innovator not given (Solar Engineering and Equipment Co., Inc.) Apr. 1980

M-FS-25157 Vol. 4, No. 3, p. 361

Installation package for solar-powered hot-air system contains such information as operation and maintenance manuals, hardware brochures, schematics, operating mode descriptions, and drawings.

B79-10341 LIQUID SOLAR COLLECTOR

Innovator not given (Florida Solar Energy Center) Apr. 1980

M-FS-25218 Vol. 4, No. 3, p. 362

Report documents evaluation test on commercial flat-plate solar collector that uses water as working fluid. Performance was measured before and after 34-day exposure to natural environment. Tables in metric and English units present data on air and water temperatures, waterflow, insolation, efficiency, and windspeed and direction.

B79-10342 FINAL REPORT ON THE CONCENTRIC-TUBE SOLAR COLLECTOR

J. C. PARKER
 Apr. 1980 See also B79-10178; B79-10199

M-FS-25188 Vol. 4, No. 3, p. 362

Report documents 26-month program to optimize performance of commercial high performance concentric tube solar collector. Report discusses program objectives, accomplishments, encountered problems, and final hardware. Certification test results are also included.

B79-10343 COLLECTOR PERFORMANCE AT VARIOUS AIR-CHANNEL DEPTHS

Innovator not given (Wyle Laboratories) Apr. 1980
M-FS-25159 Vol. 4, No. 3, p. 362

Report describes evaluation of solar collector efficiency which was measured at airflow channel depths of 3, 2, 1, and 1/2 inches in solar simulator. Data were also recorded on absorber surface temperature, inlet and outlet temperatures, airflow and insolation rates, collector differential pressure and windspeed, for result tabulation and plotting.

B79-10344 FIN-TUBE SOLAR COLLECTORS

Innovator not given (Wyle Laboratories) Apr. 1980
M-FS-25238 Vol. 4, No. 3, p. 362

Report presents test procedures and results of thermal-performance evaluation of seven commercial fin tube (liquid) solar collector-absorber plates. Tests were conducted indoors at Marshall Space Flight Center Solar simulator. Results are graphically shown along with supporting test data and summary, indicating efficiency as function of collector inlet temperature.

B79-10345 CERTIFICATION OF THE CONCENTRATING SOLAR COLLECTOR

Innovator not given (Northrup, Inc.) Apr. 1980

M-FS-25220 Vol. 4, No. 3, p. 363

Report describes procedures and results of extensive testing of concentrating solar collector performed for certification of systems compliance with government performance standards. Test includes operational, electrical, mechanical, and thermal checks, as well as structural integrity.

B79-10346 COLLECTOR PERFORMANCE AFTER WEATHERING

Innovator not given (Solar Energy Systems Div. of Wyle Laboratories) Apr. 1980 See also B78-10204

M-FS-25187 Vol. 4, No. 3, p. 363

Method drastically reduces preparation time of pentaerythritol diformal (2, 4, 8, 10-tetroxaspiro (5.5) undecane) from several hours to time span of 3 to 20 minutes with yields greater than 90 percent. Other advantages include elimination of solvents, decrease in labor and energy needs, adaptability to continuous operations, and overall simplicity and convenience.

B79-10347 CONCENTRATING SOLAR COLLECTOR - FINAL DESIGN

J. C. PARKER
 Apr. 1980 See also B78-10500

M-FS-25186 Vol. 4, No. 3, p. 363

Final report of program to improve commercially available concentrating solar collector describes final hardware, discusses problems encountered, and presents certification statements, photographs, and recommendations for modification.

B79-10348 WEATHERING OF A FLAT-PLATE SOLAR COLLECTOR

Innovator not given (Wyle Laboratories) Apr. 1980

M-FS-25160 Vol. 4, No. 3, p. 364

Report contains performance evaluation of flat-plate liquid solar collector after 14-months of natural weathering. Collector efficiency was calculated and plotted as function of inlet liquid temperature. Measurements were made of ambient temperature, inlet and outlet temperatures, differential temperature and pressure, liquid flow rate, insolation, and windspeed.

B79-10349 GUIDE TO REMOTE-SENSOR DATA SYSTEMS

R. R. DEWITT (New Tech., Inc.) and J. L. ELLISON (New Tech., Inc.)

Apr. 1980 See also NASA-CR-150837 (N79-14499)

M-FS-25169 Vol. 4, No. 3, p. 364

Remote sensing data-handbook presents theoretical and practical information on spaceborne sensors and associated systems for Earth-resources applications. Handbook provides

discussion on historical information, principles of operations, factors affecting performances, nature of data output, and system required to process data and trends in research and development.

B79-10350**SOLAR INSOLATION MODEL**

J. H. SMITH (Caltech)

Apr. 1980

NPO-14787

Vol. 4, No. 3, p. 365

Computer program SOLINS helps engineers with relatively complex task of choosing best orientation of fixed flat-plate solar collectors for local conditions. Program models average hourly solar insolation on fixed but arbitrarily-oriented surface. Consideration is given to problems of array spacing, shadowing, and use of augmentation reflectors to increase insolation at collector surface.

B79-10351**GENERAL OPTICS EVALUATION PROGRAM**

B. J. HOWELL

Apr. 1980

GSFC-12439

Vol. 4, No. 3, p. 365

Computer program GENOPTICS is generalized aid for analysis and evaluation of optical systems that employ lenses, mirrors, diffraction gratings, and other geometrical optical surfaces. It can exactly trace up to 800 rays through as many as 40 surfaces. Results can be used to compute third order aberration coefficients including spheric contributions.

B79-10352**THERMODYNAMIC AND TRANSPORT PROPERTIES OF FLUIDS**

T. E. FESSLER

Apr. 1980

LEWIS-13127

Vol. 4, No. 3, p. 365

Computer program subroutine FLUID calculates thermodynamic and transport properties of pure fluids in liquid, gas, or two-phase (liquid/gas) conditions. Program determines thermodynamic state from assigned values for temperature and density, pressure and density, temperature and pressure, pressure and entropy, or pressure and enthalpy.

B79-10481**NUCLEAR ELECTRO-OPTIC POWER**

J. J. SINGH

Jun. 1980 See also NASA-TM-78789 (N78-33538)

LANGLEY-12496

Vol. 4, No. 4, p. 487

Tertiary-nuclear power cell utilizes alpha source from which radiated particles strike phosphors which in turn emit photons that are converted to electricity by solar cell. Experiments indicated that device is capable of providing sufficient power for numerous electronic applications where reliability and long life are important.

B79-10482**PROPOSED JOSEPHSON VOLTAGE STANDARD**

C. C. CHANG (U.S. Dept. of Commerce), L. B. HOLDERMAN (U.S. Dept. of Commerce), and J. TOOTS (U.S. Dept. of Commerce)

Jun. 1980

M-FS-23845

Vol. 4, No. 4, p. 488

Relatively-simple microwave integrated circuit comprising two resonators linked by Josephson junction could be set up to generate standard Josephson volt in any industrial laboratory. Standard cells and electronic equipment could be readily compared and calibrated to this standard.

B79-10483**HIGH-EFFICIENCY WIND TURBINE**

L. A. HEIN and W. N. MYERS

Jun. 1980

M-FS-23830

Vol. 4, No. 4, p. 489

Vertical axis wind turbine incorporates several unique features to extract more energy from wind increasing efficiency 20% over conventional propeller driven units. System also features devices that utilize solar energy or chimney effluents during periods of no wind.

B79-10484**INCREASED FUEL-CELL CROSS-PRESSURE LIMIT**

W. F. BELL (United Technologies Corp.) and N. J. MAIO (United Technologies Corp.)

Jun. 1980

M-FS-25196

Vol. 4, No. 4, p. 490

Polytetrafluoroethylene (PTFE) impregnated support screen increases cross pressure on electrolyte-filled matrix in fuel-cell passive water-removed unit. This increases cell operating pressure limit which may improve performance and life characteristics of passive water-removal-type fuel cells.

B79-10485**MEASURING TRANSMISSIVITY OF SOLAR-CELL COVERS**

E. G. LAUE (Caltech)

Jun. 1980

NPO-14638

Vol. 4, No. 4, p. 490

Apparatus uses simulated solar point source refracted by condensing lens to determine ratio of transmissivity of solar cell cover material to that of standard reference specimen.

B79-10486**IMPROVED DEGRADATION RESISTANCE OF (ALGA)AS LASERS**

H. KRESSEL (RCA Corp.) and J. LADANY (RCA Corp.)

Jun. 1980 See also NASA-CR-3045 (N78-32405)

LANGLEY-12242

Vol. 4, No. 4, p. 491

Simultaneous doping with Ge and Zn improves degradation resistance of short-wavelength (AlGa)As lasers. Method opens up prospects for greatly increased reliability in lasers and LED's operating at 7,500 angstroms or below.

B79-10487**IMPROVED VAPOR-GROWTH TECHNIQUE FOR III-V COMPOUND LASERS**

C. J. BUJOCCHI (RCA Corp.), G. H. OLSEN (RCA Corp.), and T. J. ZAMEROWSKI (RCA Corp.)

Jun. 1980

LANGLEY-12255

Vol. 4, No. 4, p. 492

Vapor Growth technique of multilayered semiconductor devices based on elements in groups 3, 4, and 5 such as transmission photo cathodes and heterojunction lasers, reduces thermal decomposition and improves performance. In addition technique allows fabrication of GaP/GaAsP/InGaP, visible CW lasers through reduction of thermal decomposition.

B79-10488**GERMANIUM-ON-INP HETEROJUNCTION-STRUCTURE LED**

F. Z. HAWRYLO (RCA Corp.)

Jun. 1980

LANGLEY-12349

Vol. 4, No. 4, p. 492

Ge-on-InP heterojunction structure LED has been developed where in Ge film is evaporated onto commercially available InP substrate. Forward bias of device is approximately 1 volt, and it emits light in 9,800 angstrom region. Technique permits easy and inexpensive fabrication of LED for application at this wavelength.

B79-10489**IMPROVED THERMAL-CONDUCTING AND CURRENT-CONFINING FILM**

F. Z. HAWRYLO (RCA Corp.)

Jun. 1980

LANGLEY-12350

Vol. 4, No. 4, p. 493

Ge film that replaces SiO₂ coating in method of fabricating room-temperature CW laser diodes achieves greater heat dissipation while maintaining effectiveness as current-confining medium. Film also lessens certain unwanted strain parameters and ultimately increases lifetime of lasers. Method is applicable to fabrication of InP and (AlGa)As CW lasers.

B79-10490**OHMIC CONTACT TO P-TYPE INDIUM PHOSPHIDE**

F. Z. HAWRYLO (RCA Corp.)

Jun. 1980

03 PHYSICAL SCIENCES

LANGLEY-12351

Vol. 4, No. 4, p. 494

Low-Series-resistance ohmic contact to p-type InP semiconductor material is achieved in technique utilizing Au-Ge-Zn eutectic alloy. Alloy sets and adheres well to semiconductor surface with higher acceptor concentration at metal semiconductor interface. Technique has proved satisfactory for pn junction LED's and lasers.

B79-10491

CDINP SEMICONDUCTOR ALLOY

F. Z. HAWRYLO (RCA Corp.)

Jun. 1980

LANGLEY-12405

Vol. 4, No. 4, p. 494

Semiconductor alloy of CdSInP deposited onto CdS substrate using liquid-phase epitaxy (LPE) employed in solvent is replacement for InP n- and p-type heterojunction layers contained in GaAsP laser devices. Alloy will aid in lowering current density of laser and enhance its longevity and CW operation at room temperature.

B79-10492

SEALED HIGH-PRESSURE X-RAY DETECTOR

P. GORENSTEIN (Smithsonian Astrophysical Observatory)

Jun. 1980

GSFC-12519

Vol. 4, No. 4, p. 495

Detector is filled to pressure of 2 atm with mixture of 95% xenon and 5% methane for recording hard X-ray (50-to100-keV) images with spatial resolution of about 1 mm. Being sealed, detector requires no gas purification or replenishment after initial fill. Potential areas of application include nuclear medicine, and X-ray or gamma-ray astronomy.

B79-10493

AUTOMATICALLY CLASSIFYING EARTH FEATURES FROM ORBIT

R. L. HOLSTROM (Martin Marietta Corp.), R. T. SCHAPPELL (Martin Marietta Corp.), and J. C. TIETZ (Martin Marietta Corp.)

Jun. 1980 See also NASA-CR-158997 (N79-16339)

LANGLEY-12589

Vol. 4, No. 4, p. 496

Solid state circuit classifies satellite imagery by spectral signature of vegetation, bare land, water, clouds, or snow. Circuit can be used to sort and separate specific imagery by signature so that only useful data is transmitted to Earth. Device saves time and costs involved in manual separation of data.

B79-10494

FEP PLUG PROTECTS H2 MASERS

J. J. DELUCA and V. S. REINHARDT

Jun. 1980

GSFC-12562

Vol. 4, No. 4, p. 497

Lifetime of hydrogen-maser bulb is increased by replacing beam stop plate with thick fluorinated ethylene-propylene (FEP) plug inserted in hole opposite beam entrance stem of bulb.

B79-10495

PROGRAMMABLE SOLAR-ENERGY CONTROLLER

Innovator not given (Sunkeeper Control Corp.) Jun. 1980

M-FS-25189

Vol. 4, No. 4, p. 497

Report characterizes commercially developed solar-energy control IPECH (integrated programmable electronic controller and hydronic) subsystem, giving information used in evaluating its performance.

B79-10496

WEATHERING OF A LIQUID SOLAR COLLECTOR

Innovator not given (Solar Energy System Division of Wyle Laboratories) Jun. 1980

M-FS-25300

Vol. 4, No. 4, p. 498

Commercially available flat plate hot water solar collector is characterized in report that presents 10 month weathering study of system. Collector efficiency was calculated and plotted from measurements of fluid temperature and flow rate, ambient temperature and solar flux. Windspeed and wind direction were also measured during tests.

B79-10497

TESTING OF A SOLAR COLLECTOR WITH CONCENTRATING MIRRORS

Innovator not given (Solar Energy Systems Division of Wyle Laboratories) Jun. 1980

M-FS-25310

Vol. 4, No. 4, p. 498

Commercial flat-plate solar collector with concentrating mirrors has been tested for thermal performance, structured behavior under static load, and effects of long-term natural weathering. Report documents results of testing and concludes that absorptivity was degraded by weathering.

B79-10498

INSTALLATION PACKAGE - HOME SOLAR HEATER

Innovator not given (Contemporary Systems, Inc.) Jun. 1980

M-FS-25338

Vol. 4, No. 4, p. 498

Installation of commercial solar-heating system at two story, three bedroom house in New Hampshire is described in 65 page report. System collectors are integrated part of building replacing conventional roofing or siding. Report also includes general description of system, its operation and guidelines, orientation and references.

B79-10499

MONTE CARLO VARIANCE REDUCTION

N. R. BYRN (Science Applications, Inc.)

Jun. 1980

M-FS-23645

Vol. 4, No. 4, p. 499

Computer program incorporates technique that reduces variance of forward Monte Carlo method for given amount of computer time in determining radiation environment in complex organic and inorganic systems exposed to significant amounts of radiation.

B79-10500

WIND-ENERGY STORAGE

L. H. GORDON

Jun. 1980 See also NASA-CR-135283 (N78-20802); NASA-CR-135284 (N78-20803); NASA-CR-135285 (N78-20804)

LEWIS-13097

Vol. 4, No. 4, p. 499

Program SIMWEST can model wind energy storage system using any combination of five types of storage: pumped hydro, battery, thermal, flywheel, and pneumatic. Program is tool to aid design of optional system for given application with realistic simulation for further evaluation and verification.

B79-10501

LANDSAT SIGNATURE DEVELOPMENT PROGRAM

R. A. BLAND

Jun. 1980

KSC-11113

Vol. 4, No. 4, p. 500

LANDSAT signature development program (LSDP) automatically produces unsupervised classification of scene from LANDSAT data tape. Program is effective enough to be useful to sophisticated remote sensing analyst yet is simple enough to be utilized by ground truth investigators who have only basic understanding of computer and remote sensing procedures.

04 MATERIALS

B79-10068

'SELF-PACKAGING' DESICCANT

R. F. FEDORS

Aug. 1979

NPO-14354

Vol. 4, No. 1, p. 67

Desiccant, consisting of water-soluble filler contained in water-permeable elastomeric matrix, absorbs large quantities of water without becoming sticky or releasing corrosive agents.

Desiccant may be molded into virtually any shape depending on area of application.

**B79-10069
IRRADIATION PRETREATMENT FOR COAL DESULFURIZATION**

G. C. HSU

Aug. 1979

NPO-14104 Vol. 4, No. 1, p. 68

Process using highly-penetrating nuclear radiation (Beta and Gamma radiation) from nuclear power plant radioactive waste to irradiate coal prior to conventional desulfurization procedures increases total extraction of sulfur.

**B79-10070
FLUIDIZED COAL COMBUSTION**

P. I. MOYNIHAN and D. L. YOUNG

Aug. 1979

NPO-14273 Vol. 4, No. 1, p. 69

Fluidized-bed coal combustion process, in which pulverized coal and limestone are burned in presence of forced air, may lead to efficient, reliable boilers with low sulfur dioxide and nitrogen dioxide emissions.

**B79-10071
SODA ASH REMOVES SULFUR FROM FUELS**

J. DOOHER (Adelphi Univ.), S. MOON (Adelphi Univ.), and D. WRIGHT (Adelphi Univ.)

Aug. 1979

GSFC-12403 Vol. 4, No. 1, p. 69

Test shows that adding soda ash (sodium bicarbonate) to coal/oil/water emulsion reduces 75 to 80% of sulfur dioxide gas emitted during subsequent combustion of emulsion.

**B79-10072
A CONTINUOUS SILICON-COATING FACILITY**

C. BUTTER (Honeywell, Inc.) and J. D. HEAPS (Honeywell, Inc.)

Aug. 1979

NPO-14373 Vol. 4, No. 1, p. 70

Automatic continuous silicon-coating facility is used to process 100 by 10 cm graphite-coated ceramic substrates for silicon solar cells. Process reduces contamination associated with conventional dip-coating processes, improving material service life.

**B79-10073
SILICON TETRACHLORIDE SPRAY FEEDER**

T. N. MEYER (Westinghouse Electric Corp.) and C. B. WOLF (Westinghouse Electric Corp.)

Aug. 1979

NPO-14382 Vol. 4, No. 1, p. 71

Silicon tetrachloride spray feeder mechanism is incorporated into high-temperature reactor for production of highly pure silicon intended for solar cells. Feeder supplies silicon tetrachloride as liquid droplets that rapidly vaporize in high temperature (2,000 to 2,200 K) reactor zone.

**B79-10074
A REACTOR FOR MORE EFFICIENT SOLAR CELLS**

M. G. FEY (Westinghouse Electric Corp.), T. N. MEYER (Westinghouse Electric Corp.), and C. B. WOLF (Westinghouse Electric Corp.)

Aug. 1979

NPO-14381 Vol. 4, No. 1, p. 72

Reactor produces highly pure silicon at relatively high temperature of 2,000 K. Process separates liquid silicon product from gaseous coproducts more easily than conventional lower-temperature processes. High production rates may be obtained in relatively small reaction chambers which could include means for collecting or casting silicon ingots.

**B79-10075
CHEMICAL-VAPOR-DEPOSITION REACTOR**

S. CHERN

Aug. 1979

NPO-14137 Vol. 4, No. 1, p. 73

Reactor utilizes multiple stacked trays compactly arranged in paths of horizontally channeled reactant gas streams. Design allows faster and more efficient deposits of film on substrates, and reduces gas and energy consumption. Lack of dead spots that trap reactive gases reduces reactor purge time.

**B79-10076
SILICON SOURCE FOR VACUUM DEPOSITION**

G. W. RACETTE (General Electric Co.) and D. J. RUTECKI (General Electric Co.)

Aug. 1979

LANGLEY-12356 Vol. 4, No. 1, p. 74

Device using two independent silicon sources for ultra-high-vacuum deposition on large substrates can deposit P and N types of silicon simultaneously. Efficient water cooled copper shield supports and cools structure and isolates two filaments.

**B79-10077
LOW ABSORPTANCE PORCELAIN-ON-ALUMINUM COATING**

H. LEGGETT

Aug. 1979

M-FS-23879 Vol. 4, No. 1, p. 75

Porcelain thermal-control coating for aluminum sheet and foil has solar absorptance of 0.22. Specially formulated coating absorptance is highly stable, changing only 0.03 after 1,000 hours of exposure to simulated sunlight and can be applied by standard commercial methods.

**B79-10078
BURNING CRUDE OIL WITHOUT POLLUTION**

J. HOUSEMAN

Aug. 1979

NPO-14344 Vol. 4, No. 1, p. 76

Crude oil can be burned at drilling sites by two-stage combustion process without producing pollution. Process allows easier conformance to strict federal or state clean air standards without installation of costly pollution removal equipment. Secondary oil recovery can be accomplished with injection of steam heating by burning oil.

**B79-10079
CONTINUOUS STERILIZATION OF PLUMBING SYSTEMS**

C. J. BRYAN, C. V. MOYERS, and E. E. WRIGHT, JR.

Aug. 1979

KSC-11085 Vol. 4, No. 1, p. 77

Continuous sterilization of plumbing, such as in hospitals, clinics, and biological testing laboratories is possible with ethylene oxide/Freon 12 (ETO/F-12) humidifier developed for sterilization of potable water systems.

**B79-10080
CONTROLLED METAL-FILM DEPOSITION ON ALUMINA SUBSTRATES**

E. H. LEE, R. D. MOORHEAD, and H. POPPA

Aug. 1979

ARC-11214 Vol. 4, No. 1, p. 78

Report describes results of investigation of preparation, nucleation and controlled growth of particulate deposits (palladium and iron) on electron-transparent alumina substrates. Results indicate that characteristic properties of metal deposits are strongly dependent on cleanliness, phase, and crystallographic orientation of substrate.

**B79-10208
THERMOLUMINESCENCE ANALYSIS OF AEROSOLS**

E. R. LONG, JR. and R. S. ROGOWSKI

Dec. 1979 See also NASA-TM-X-72795 (N76-21743)

LANGLEY-12046 Vol. 4, No. 2, p. 219

Method is presented for identifying air pollutants in field or laboratory by technique based on thermoluminescence. Approach is useful in tracing dispersion of pollutants over geographical regions and in determining cancer causing agents in the upper atmosphere.

04 MATERIALS

B73-10209

INSTRUMENT FOR AEROSOL CHARACTERIZATION

G. VARS (Caltech)

Dec. 1979

NPO-14320

Vol. 4, No. 2, p. 220

Differential pumping system that directs particles into beam moving at high speed measures size distribution and chemical composition of aerosols and is useful in study of atmospheric contamination, smog, stack gases, and chemical aerosols.

B75-10210

REMOTE MEASUREMENT OF ATMOSPHERIC POLLUTANTS

F. ALLARIO, J. HOELL, and R. K. SEALS

Dec. 1979

LANGLEY-12277

Vol. 4, No. 2, p. 221

The concentration and vertical distribution of atmospheric ammonia and ozone are remotely sensed, using dual-CO₂-laser multichannel infrared Heterodyne Spectrometer (1HS). Innovation makes atmospheric pollution measurements possible with nearly-quantum-noise-limited sensitivity and ultrafine spectral resolution.

B79-10211

MONITORING HARMFUL GASES

W. R. HELMS and J. R. STETTER (Energetics Science, Inc.)

Dec. 1979 See also NASA-CR-153048 (N77-23439); NASA-CR-155770 (N78-18224)

KSC-11086

Vol. 4, No. 2, p. 222

Instruments are developed for monitoring presence of hydrazine and nitrogen dioxide in air. Nitrogen dioxide and hydrazine are highly toxic and explosive substances used in propellants for rocket engines. Instruments discussed are inexpensive and most useful for detecting above substances in concentrations as low as few parts per million.

B79-10212

WATER-SOLUBLE FLUOROCARBON COATING

P. NANELLI (Pennwalt Corp.)

Dec. 1979 See also B79-10213

MSC-16562

Vol. 4, No. 2, p. 223

Water-soluble fluorocarbon proves durable nonpolluting coating for variety of substrates. Coatings can be used on metals, masonry, textiles, paper, and glass, and have superior hardness and flexibility, strong resistance to chemicals fire, and weather.

B79-10213

WATER-BASED INTUMESCENT PAINT

D. G. SAUERS and P. NANELLI (Pennwalt Corp.)

Dec. 1979 See also B79-10212

MSC-16609

Vol. 4, No. 2, p. 224

Article discusses fire-resistant water-based paints made by adding intumescent agents to fluorocarbon coatings. Since these paints are water-based, they do not pollute atmosphere as they dry and can be used in a closed-loop air-recirculation system in spacecraft and submarines.

B79-10214

HIGH-TEMPERATURE ADHESIVES FOR POLYIMIDE FILMS

A. K. ST. CLAIR, T. L. ST. CLAIR, and W. S. SLEMP

Dec. 1979

LANGLEY-12348

Vol. 4, No. 2, p. 224

Linear condensation polyimides which are high-temperature polymers show promise as adhesives which form flexible film coatings compatible with polyimide films. Materials are advantageous since they can be supplied as flexible tape, already B-staged and ready for bonding.

B75-10215

MODIFIED POLYMERS FOR GAS CHROMATOGRAPHY

F. H. WOELLER (San Jose State Univ.), W. CHRISTENSEN, and L. MAYER (San Jose State Univ.)

Dec. 1979

ARC-11154

Vol. 4, No. 2, p. 226

Polymeric materials are modified to serve as stationary phase in chromatographic columns used for separation of atmospheric

gases. Materials simplify and improve separation of atmospheric gases in terms of time, quantity of material needed, and sharpness of separation.

B79-10216

DETERMINING RESIN/FIBER CONTENT OF LAMINATES

G. G. GARRARD (Rockwell International Corp.) and D. W. HOUSTON (Rockwell International Corp.)

Dec. 1979

LANGLEY-12442

Vol. 4, No. 2, p. 227

Article discusses procedure where hydrazine is used to extract graphite fibers from cured polyimide resin. Method does not attack graphite fibers and is faster than hot-concentrated-acid digestion process.

B79-10217

SYNTHESIS OF TRIARYLTRIFLUOROETHANES

R. W. ROSSER and W. D. KRAY (Talladega College)

Dec. 1979

ARC-11097

Vol. 4, No. 2, p. 228

Article discusses preparation of triary1-2,2,2-trifluoroethanes prepared from a,a,a-trifluoroacetone by condensation with various substituted aromatic compounds. Compounds are useful as they have high thermal stability.

B79-10218

FLAT-FLAME BURNER

G. C. FRYBURG, F. J. KOHL, R. A. MILLER, and C. A. STERNS

Dec. 1979 See also NASA-TM-X-73600 (N77-19209); NASA-TM-73794 (N78-13157); B79-10219

LEWIS-13161

Vol. 4, No. 2, p. 229

Aqueous solutions of inorganic salts are aspirated and then nebulized into mixing chamber of flat-flame burner to study behavior of inorganic salts in flames.

B79-10219

HIGH-PRESSURE MASS-SPECTROMETRIC SAMPLING SYSTEM

G. C. FRYBURG, F. J. KOHL, R. A. MILLER, and C. A. STERNS

Dec. 1979 See also NASA-TM-73720 (N77-32242); B79-10218

LEWIS-12913

Vol. 4, No. 2, p. 230

Mass spectrometric sampler directs sampling of gaseous species from systems at atmospheric pressure. Method is accomplished through orifice machined in platinum cone.

B79-10220

ANALYSIS OF FATIGUE DAMAGE IN COMPOSITES

J. D. WHITCOMB

Dec. 1979 See also NASA-TM-78693 (N78-23457)

LANGLEY-12431

Vol. 4, No. 2, p. 231

Finite-element heat-transfer analysis determines sites of potential failure in composite materials. Method is sensitive to matrix damage and fiber disbonding that occurs long before actual fiber breakage.

B79-10221

STRENGTH ENHANCEMENT OF PREALLOYED POWDER SUPERALLOYS

J. C. FRECHE and W. J. WATERS

Dec. 1979 See also NASA-TM-78834 (N78-21266)

LEWIS-13173

Vol. 4, No. 2, p. 232

Strengthening and forming process for prealloyed powder superalloys greatly increases material strength in the 900-1,200 F temperature range. Process which involves superplastically-deforming compacted powders at controlled rates and temperature is most effective on nickel-base alloys.

B79-10222

IMPROVED ION-SELECTIVE MEMBRANES

S. S. ALEXANDER (Ionics, Inc.)

Dec. 1979 See also NASA-CR-134931 (N76-18670); NASA-CR-135316 (N78-18515); NASA-TM-73751 (N78-14631); NASA-TM-73873 (N78-19656); B76-10070

LEWIS-12678

Vol. 4, No. 2, p. 233

Ion-selective membranes are developed in evolution of

REDOX (reduction-oxidation) electrochemical bulk energy storage concept which have exceptional selectivity giving three orders of magnitude improvement over commercially available membranes.

B79-10223

IMPROVED INVERTED STEPANOV APPARATUS

S. BERKMAN (RCA Corp.) and H. E. TEMPLE (RCA Corp.)

Dec. 1979

NPO-14287

Vol. 4, No. 2, p. 234

Modifications in inverted Stepanov process improve heat transfer and energy efficiency in growing silicon ribbon crystals. Using system, silicon is directly heated by induction, minimizing heat transfer and contamination problems.

B79-10224

FIBROUS REFRACTORY COMPOSITE INSULATION

H. E. GOLDSTEIN, M. SMITH, and D. B. LEISER (Stanford Univ.)

Dec. 1974

ARC-11169

Vol. 4, No. 2, p. 235

Family of high-temperature, low-density refractory composite insulations made from aluminoborosilicate and silica fibers has insulating material with improved mechanical and thermal properties. Composition is useful for reusable heat-shield materials.

B79-10225

FATIGUE PROPERTIES OF COLUMBIUM ALLOY

R. A. CROSBY (The Marquardt Co.) and F. K. LAMPSON (The Marquardt Co.)

Dec. 1979

MSC-18256

Vol. 4, No. 2, p. 235

Report presents data from series of tests undertaken to determine room-temperature fatigue properties of C-103 columbium alloy and its combination with Ti-6Al-4V weldments.

B79-10226

USE OF COMPOSITES IN ELECTRIC VEHICLES

R. H. DAWE (Caltech), D. B. EDWARDS (Caltech), and H. A. FRANK (Caltech)

Dec. 1979

NPO-14615

Vol. 4, No. 2, p. 236

Report presents study of weight savings in electric vehicles by using alternative structural materials, particularly composites. Topics discussed include safety, aerodynamics, esthetics, and cost.

B79-10353

FLAME-RESISTANT TEXTILES

L. C. FOGG (Sci. Appl., Inc.), R. S. STRINGHAM (Sci. Appl., Inc.), and M. S. TOY (Sci. Appl., Inc.)

Apr. 1980 See also NASA-CR-151834 (N79-10149)

MSC-18359

Vol. 4, No. 3, p. 369

Flame resistance treatment for acid resistant polyamide fibers involving photoaddition of fluorocarbons to surface has been scaled up to treat 10 yards of commercial width (41 in.) fabric. Process may be applicable to other low cost polyamides, polyesters, and textiles.

B79-10354

FOUR-STEP REACTION FOR POLYTRIAZINE ELASTOMERS

R. W. ROSSER and R. A. KORUS (San Jose State University)

Apr. 1980

ARC-11248

Vol. 4, No. 3, p. 370

Four step imidoylamidine reaction sequence is used to make crosslinked polyperfluoralkyltriazines with superior elastomeric properties, greater molecular weight, and crosslinking control. Polymers can find useful application in fuel tank sealants, o-ring, wire enamels, pneumatic ducts, and many other applications.

B79-10355

HEAT- AND CHEMICAL-RESISTANT OXADIAZOLE ELASTOMERS

R. W. ROSSER, H. KWONG (San Jose State Foundation), and I. M. SHALHOUB (San Jose State Foundation)

Apr. 1980

ARC-11253

Vol. 4, No. 3, p. 371

Heat and chemical resistant polymers with triazine crosslinks are prepared by thermal condensation reactions to form 1,2,4-oxadiazole linkages. They are compounded with variety of fillers, extenders, and modifiers for numerous applications in which stability, impermeability to liquids and gases, good plasticity, and elasticity or rigidity are important.

B79-10356

SYNTHESIS OF 2, 4, 8, 10-TETROXASPIRO (5.5) UNDECANE

A. C. POSHKUS (National Res. Council)

Apr. 1980

ARC-11243

Vol. 4, No. 3, p. 371

Method drastically reduces preparation time pentaerythritol diformal from several hours to time span of 3 to 20 minutes with yields greater than 90 percent. Other advantages include elimination of solvents, decrease in labor and energy needs, adaptability to continuous operations, and overall simplicity and convenience.

B79-10357

RELATING VISCOSITY TO POLYMER CONCENTRATION

R. F. FEDORS (Caltech)

Apr. 1980

NPO-14609

Vol. 4, No. 3, p. 372

Equation developed by VanDijk and first applied to viscosity of Newtonian suspension of rigid particles by Eilers is rearranged to yield intrinsic viscosity as explicit function of polymer concentration in polymer solvent system. Experiments have shown relationship valid for polymer solutions having relative viscosities ranging from 1 to 100.

B79-10358

SIMPLE ESTIMATE OF CRITICAL VOLUME

R. F. FEDORS (Caltech)

Apr. 1980

NPO-14644

Vol. 4, No. 3, p. 373

Method for estimating critical molar volume of materials is faster and simpler than previous procedures. Formula sums no more than 18 different contributions from components of chemical structure of material, and is as accurate (within 3 percent) as older more complicated models. Method should expedite many thermodynamic design calculations.

B79-10359

EQUILIBRIUM SWELLING OF ELASTOMERS IN SOLVENTS

R. F. FEDORS (Caltech)

Apr. 1980

NPO-14637

Vol. 4, No. 3, p. 374

Two proposed empirical equations, developed from Eilers-VanDijk equation to characterize relative modulus of filled elastomers as function of filler content, describe: (1) equilibrium swelling for cases where fillers are composed of permanent aggregates of primary particles; and (2) equilibrium swelling when filler material is composed of non-aggregated particles.

B79-10360

DOUBLE-WALL TUBING FOR OIL RECOVERY

L. H. BACK (Caltech), W. F. CARROLL (Caltech), L. D. JAFFEE (Caltech), and L. D. STIMPSON (Caltech)

Apr. 1980 See also B79-10369

NPO-14606

Vol. 4, No. 3, p. 375

Insulated double-wall tubing designed for steam injection oil recovery makes process more economical and allows deeper extension of wells. Higher quality wet steam is delivered through tubing to oil deposits with significant reductions in heat loss to surrounding rock allowing greater exploitation of previously unworkable reservoirs.

B79-10361

POST-PROCESSING FLAME-RETARDANT FOR POLYURETHANE

P. MONAGHAN (Arthur D. Little, Inc.) and K. R. SIDMAN (Arthur D. Little, Inc.)

Apr. 1980 See also NASA-CR-144362 (N75-29264)

04 MATERIALS

MSC-16307 Vol. 4, No. 3, p. 376

Treatment of polyurethane foam with elastomer formulation after processing makes foam fire resistant without compromising physical properties. In testing, once ignition source is removed, combustion stops. Treatment also prevents molten particle formation, generates no smoke or toxic gases in fire, and does not deteriorate under prolonged exposure to Sun.

B79-10362
OZONE INHIBITS CORROSION IN COOLING TOWERS

K. R. FRENCH (Caltech), R. D. HOWE (Caltech), and M. F. HUMPHREY (Caltech)
Apr. 1980

NPO-14340 Vol. 4, No. 3, p. 377

Commercially available corona discharge ozone generator, fitted onto industrial cooling tower, significantly reduces formation of scales (calcium carbonate) and corrosion. System also controls growth of algae and other microorganisms. Modification lowers cost and improves life of cooling system.

B79-10363
MEASURING COAL THICKNESS

C. BARKER (Univ. of Missouri at Rolla), J. BLAINE (Univ. of Missouri at Rolla), G. GELLER (Univ. of Missouri at Rolla), R. ROBINSON (Univ. of Missouri at Rolla), D. SUMMERS (Univ. of Missouri at Rolla), and J. TYLER
Apr. 1980

M-FS-23979 Vol. 4, No. 3, p. 378

Laboratory tested concept, for measuring thickness of overhead coal using noncontacting sensor system coupled to controller and high pressure water jet, allows mining machines to remove virtually all coal from mine roofs without danger of cutting into overlying rock.

B79-10364
PRECISE WET-CHEMICAL ETCHING

F. J. GRUNTHANER (Caltech)
Apr. 1980

NPO-14339 Vol. 4, No. 3, p. 379

Controlled amount of etchant applied to surface of rotating sample removes only few angstroms of material. Technique is suited to study of chemical and crystal structures. Rate can be varied through control of spin frequency, liquid viscosity, droplet size, total etchant volume, etchant concentration.

B79-10365
DETECTING OXYGEN IN HYDROGEN OR HYDROGEN IN OXYGEN

A. C. ERICKSON (General Electric Co.)
Apr. 1980

MSC-18380 Vol. 4, No. 3, p. 380

Catalytic sensor operates in high-pressure, moisture-laden gases. It was developed for life support system in which water is decomposed by electrolysis to produce oxygen and hydrogen. Sensor has potential applications in gas-detection and measurement instruments, particularly for gases generated by electrolysis, because such gases may contain large amounts of moisture.

B79-10366
AN IMPROVED CAPILLARY RHEOMETER

S. P. FEINSTEIN (Caltech)
Apr. 1980

NPO-14501 Vol. 4, No. 3, p. 380

Capillary rheometer incorporates cone-tipped preheated piston to compress plastized coal sample through narrow tube. Applied force is proportional to viscosity and is recorded on separate instrument. Samples are heated rapidly due to large area of cone surface. Device, primarily applied in designing efficient equipment for feeding coal into combustion chamber, may be readily used in other viscosity studies.

B79-10367
NEW APPROACH TO PURIFYING SILICON

R. E. CHANEY (Motorola, Inc.), W. M. INGLE (Motorola, Inc.), and S. W. THOMPSON (Motorola, Inc.)
Apr. 1980

NPO-14474

Vol. 4, No. 3, p. 381

Silicon tetrafluoride gas removes metallurgical-grade impurities when passed over silicon in quartz tube. Technique allows inexpensive increase in throughput rate. Approach could improve silicon production for silicon solar cells.

B79-10368
COMPACT REACTOR FOR ONBOARD HYDROGEN GENERATION

T. A. BRABBS
Apr. 1980 See also NASA-TP-1247 (N78-23256)

LEWIS-13033 Vol. 4, No. 3, p. 382

Hydrogen, chemically stored as methanol, is promising internal-combustion fuel. Methanol is readily obtainable from natural products such as wood, compost, or various organic wastes. Steam reformation of methanol as source for hydrogen is relatively simple operation.

B79-10369
WATER-COOLED INSULATED STEAM-INJECTION WELLS

L. H. BACK (Caltech) and L. D. JAFFE (Caltech)
Apr. 1980

NPO-14605 Vol. 4, No. 3, p. 383

Water is used as insulated coolant and heat-transfer medium for steam-injection oil wells. Approach is somewhat analogous to cooling system in liquid-propellant rocket. In addition to trapping and delivering heat to steam-injection point, water will also keep casing cooler, preventing or reducing casing failures caused by thermal stresses.

B79-10370
HIGH-TEMPERATURE INSULATION

R. E. MOWERS (Rockwell Intern. Corp.) and A. C. PETERSON (Rockwell Intern. Corp.)
Apr. 1980

M-FS-19498 Vol. 4, No. 3, p. 384

Lightweight insulating material works over very broad temperature range. Material is unaffected by moisture or hydraulic oil and is usable at temperatures ranging from 2,200 F (1,200 C) to cryogenic levels. It is readily applied to number of high-temperature and cryogenic processes.

B79-10371
MOSSBAUER STUDY OF FESi2 AND FESE THIN FILMS

K. AGGARWAL, W. T. ESCUE, and R. G. MENDIRATTA
Apr. 1980

M-FS-25088 Vol. 4, No. 3, p. 384

Structural studies of FeSi₂ and FeSe thin films have been conducted via Mossbauer spectroscopy as continuation of earlier investigation of FeTe films. Results discuss structures of bulk and thin-film FeSi₂ and bulk and thin-film FeSe.

B79-10372
STRESS CORROSION IN HIGH-STRENGTH ALUMINUM ALLOYS

R. C. DORWARD (Kaiser Aluminum and Chemical Corp.) and K. R. HASSE (Kaiser Aluminum and Chemical Corp.)
Apr. 1980

M-FS-23986 Vol. 4, No. 3, p. 385

Report describes results of stress-corrosion tests on aluminum alloys 7075, 7475, 7050, and 7049. Tests compare performance of original stress-corrosion-resistant (SCR) aluminum, 7075, with newer, higher-strength SCR alloys. Alloys 7050 and 7049 are found superior in short-transverse cross-corrosion resistance to older 7075 alloy; all alloys are subject to self-loading effect caused by wedging of corrosion products in cracks. Effect causes cracks to continue to grow, even at very-low externally applied loads.

B79-10373
TEMPERATURE AND MOISTURE ANALYSIS IN COMPOSITES

D. R. TENNEY, S. S. TOMPKINS, and J. UNNAM (Geo. Washington Univ.)
Apr. 1980

LANGLEY-12452 Vol. 4, No. 3, p. 385

Advanced fiber-reinforced polymeric matrix composites have emerged as strong candidate materials for airframe applications. Favorable aspects include high strength, stiffness, and low density. Temperature and Moisture Analysis in Composites (TMAC) program was developed to study effect of variations in diffusion coefficients, surface properties, panel tilt, ground reflection, and geographical location on moisture-concentration profiles and average moisture contents of composite laminates.

**B79-10502
SIMULTANEOUS STACK-GAS SCRUBBING AND WASTE WATER TREATMENT**

J. C. PORADEK and D. D. COLLINS (Chemsoil Corp.)
Jun. 1980 See Also NASA-CR-160280 (N80-12620)
MSC-16258 Vol. 4, No. 4, p. 503

Simultaneous treatment of wastewater and SO₂-laden stack gas make both treatments more efficient and economical. According to results of preliminary tests, solution generated by stack gas scrubbing cycle reduces bacterial content of wastewater. Both processes benefit by sharing concentrations of iron.

**B79-10503
LOW COST DISPOSAL OF MMH**

J. J. THOMAS (Florida Institute of Technology) and T. FRENCH (Florida Institute of Technology)
Jun. 1980
KSC-11135 Vol. 4, No. 4, p. 504

Concentration of gaseous toxic monomethylhydrazine (MMH) can be removed at 99.9% efficiency using scrubbers containing acetylacetone solutions as scrubbing liquids. Resulting product is easily disposable and expensive liners for protecting scrubber from strong oxidizing agents are not needed.

**B79-10504
A LOW-COST MOLECULAR-LEAK VALUE**

C. M. JUDSON (Analog Technology Corp.), J. L. LAWRENCE, JR. (Analog Technology Corp.), and F. P. PICKETT (Analog Technology Corp.)
Jun. 1980
LANGLEY-12249 Vol. 4, No. 4, p. 505

Solenoid operated modular-leak and shutoff valve has been developed for small portable, automated, mass spectrometer used to measure trace constituents of air or other gases. Valve costs much less to produce than precision needle-in-foil type. Yet its performance closely matches that version.

**B79-10505
IMPROVED SYNTHESIS OF POLYFORMALS**

A. C. POSHKUS
Jun. 1980
ARC-11244 Vol. 4, No. 4, p. 506

Polyformals are prepared in less than 15 min. as opposed to hours or days by conventional processes. Product can be converted into ethylenically unsaturated monomers and into aphrogenic and pyrostatic phosphorylated derivatives and the like.

**B79-10506
SEPARATING LIQUID AND GASEOUS SOLUTIONS**

J. W. BENEFIELD (Lockheed Aircraft Corp.) and P. GRODZKA (Lockheed Aircraft Corp.)
Jun. 1980
M-FS-23368 Vol. 4, No. 4, p. 506

Clusius-Dickel separation (CDS) technique, currently used in laboratory scale separation of certain isotopes, may find more effective applications in low-gravity, space environments. Many advantages in power supply, mechanical stresses, and spatial arrangement can be realized in space, making technique suitable for biological and polymer separations.

**B79-10507
SELF-CURING POLYIMIDE FOAM**

S. R. RICCIOTTO and P. M. SAWKO
Jun. 1980
ARC-11170 Vol. 4, No. 4, p. 507

Chemical formulation produces foamed polyimide plastic without external heat. Foam is less dense and more flame and

acid resistant than conventional polyimide foams. Self curing foam can be formed 'onsite' in limited access locations where application of heat is difficult or impossible.

**B79-10508
COMPOSITES OF IMMISCIBLE METALS**

M. H. JOHNSTON, J. C. MCCLURE, and R. A. PARR
Jun. 1980
M-FS-23816 Vol. 4, No. 4, p. 508

Process aids development of composites of metals that are immiscible in liquid phase. Aligned uniformly dispersed spheres or rods of bismuth in aluminum, lead in aluminum, bismuth in zinc, and other systems have been prepared. Dispersed and matrix metal are selected according to desired electrical or mechanical properties.

**B79-10509
VACUUM-BONDED COVERING WITHSTANDS LOW TEMPERATURES**

G. LERMA (Rockwell International Corp.) and Z. SIMINSKI (Rockwell International Corp.)
Jun. 1980
MSC-16235 Vol. 4, No. 4, p. 509

Aluminum foil, tetrafluoroethylene (TEF), and glass fabric are vacuum bonded together to make composite covering material that is flexible, easy to handle, and unaffected by cryogenic temperatures.

**B79-10510
LONGER SHELF LIFE FOR CERAMIC SLURRIES**

Y. D. IZU (Lockheed Missiles and Space Co.) and T. M. TANABE (Lockheed Missiles and Space Co.)
Jun. 1980
MSC-18543 Vol. 4, No. 4, p. 509

Viscosity of ceramic-coating slurries containing organic acrylate viscosity-control agent is stabilized for over 2 months by addition of ammonium hydroxide without significant changes.

**B79-10511
SHEAR STRENGTH OF ALUMINUM FILLET WELDS**

C. V. LOVOY
Jun. 1980 See also NASA-TM-78168 (N78-21495)
M-FS-23946 Vol. 4, No. 4, p. 510

Shear-strength tests on aluminum fillet welds are documented in report. Tests were made on aluminum alloy 2219 to aid designers in specifying sizes and lengths of fillet welds necessary to sustain expected loads in this material. Report discusses fillet-weld size and geometry, including root penetration and surface contour.

**B79-10512
ENGINEERING PROPERTIES OF INCOLOY-903 AND CTX-1**

P. E. RUFF (Battelle Memorial Inst.)
Jun. 1980
M-FS-23359 Vol. 4, No. 4, p. 510

Engineering properties of Incoloy-903 sheet and CTX-1 (high strength austenitic Fe-Ni-Co alloy) bar are characterized in report. Report includes tables and plots of test data and photographs of microstructure of samples used. Two appendixes include specimen configuration and data collected from industrial survey.

**B79-10513
UNRESOLVED MOSSBAUER HYPERFINE SPECTRA**

J. R. SCHIESS and J. J. SINGH
Jun. 1980
LANGLEY-12439 Vol. 4, No. 4, p. 511

Program analyzes unresolved Mossbauer hyperfine spectra resulting from existence of several local environments in dilute binary iron alloys. It has proven useful in studying effects of impurity atoms on iron Mossbauer spectra.

**B79-10514
SINGLE-, TWO-, AND THREE-PHASE BINARY-ALLOY SYSTEMS**

D. R. TENNEY
Jun. 1980

05 LIFE SCIENCES

LANGLEY-12381

Vol. 4, No. 4, p. 511

Series of three computer programs solve one dimensional transient diffusion problems in single and multiphase binary-alloy systems. Accurate understanding of diffusion process in binary-alloy system is important for development of metal matrix composites, some protective coatings, and thin-film technology.

05 LIFE SCIENCES

B79-10081

HIGH-RESOLUTION ECHOCARDIOGRAPHY

R. NATHAN

Aug. 1979

NPO-14349

Vol. 4, No. 1, p. 81

High resolution computer aided ultrasound system provides two and three dimensional images of beating heart from many angles. System provides means for determining whether small blood vessels around the heart are blocked or if heart wall is moving normally without interference of dead and noncontracting muscle tissue.

B79-10082

MICROCOMPUTER HELPS EVALUATE SKIN BURNS

V. J. ANSELMO and T. H. REILLY

Aug. 1979

NPO-14402

Vol. 4, No. 1, p. 82

Microcomputer analysis of multispectral imaging of burn area aids production of display map of field and partial thickness burns making more effective clinical treatment possible.

B79-10083

ARTIFICIAL LIMB CONNECTOR

C. W. BRIGHT, L. J. OWENS, V. MOONEY (Rancho Los Amigos Hospital), and J. B. RESWICK (Rancho Los Amigos Hospital)

Aug. 1979

KSC-11069

Vol. 4, No. 1, p. 83

Flexible connector gives skin freedom needed to self-adjust to promote healing of flesh and to relieve skin stresses while maintaining skin seal surrounding implanted percutaneous sleeve used with bone fixation prosthetic connector.

B79-10084

EYE-CONTROLLED SWITCH

G. L. WALKER (Hayes International Corp.) and B. G. WEAVER (Hayes International Corp.)

Aug. 1979

M-FS-25091

Vol. 4, No. 1, p. 84

Eye motion sensor clipped to standard eyeglass frame and circuit allows electric wheel chair to be controlled by eye movements alone.

B79-10085

IDENTIFICATION OF MICRO-ORGANISMS

G. R. TAYLOR and S. N. ZALOGUEV (U.S.S.R. Ministry of Health)

Aug. 1979 See also NASA-TM-58185 (N78-29725)

MSC-18358

Vol. 4, No. 1, p. 85

Manual presents detailed laboratory procedures for identifying aerobic or microaerobic bacteria, yeast or yeastlike organisms, and filamentous fungi and conducting other microbiological or immunological evaluations of samples taken from human subjects. Standardized procedures should be useful to researchers and clinicians in laboratories, hospitals and other biological test facilities.

B79-10227

IMPROVED TEMPERATURE-CONTROL GARMENT

R. L. COX (Vought Corp.) and C. W. HIXON (Vought Corp.)

Dec. 1979

ARC-11239

Vol. 4, No. 2, p. 239

Multilayer fabric containing polyurethane tubing is used in

fabrication of liquid cooled garments. Cooling helmets may be assembled from material and various garments used for heating can be developed.

B79-10228

PLATINUM ELECTRODES FOR ELECTROCHEMICAL DETECTION OF BACTERIA

J. R. WILKINS

Dec. 1979 See also B78-10236

LANGLEY-12462

Vol. 4, No. 2, p. 240

Bacteria is detected electro-chemically by measuring evolution of hydrogen in test system with platinum and reference electrode. Using system, electrodes of platinum are used to detect and enumerate varieties of gram-positive and gram-negative organisms compared in different media.

B79-10229

WIDEBAND ELECTRONICS FOR ULTRASONIC TISSUE CHARACTERIZATION

P. GAMMELL (Caltech)

Dec. 1979

NPO-14461

Vol. 4, No. 2, p. 241

System utilizing natural ringing frequency of electronic circuit coupled to wideband transducer is used to determine frequency dependence of ultrasonic properties of tissue. With procedure frequency data can be obtained rapidly and inexpensively.

B79-10230

COUPLER FOR SURGERY ON SMALL ANIMALS

J. E. JOHNSON, JR. and P. F. SWARTZ

Dec. 1979

ARC-11114

Vol. 4, No. 2, p. 242

Minicoupler simplifies exchange of fluids with organs of laboratory animals enabling one person to perform surgery on experimental animals such as rats and mice. Innovation eliminates obstructing hands and instruments from areas of surgery.

B79-10231

CINEMICROGRAPHIC SPECIMEN HOUSING

J. R. WILKINS

Dec. 1979

LANGLEY-12047

Vol. 4, No. 2, p. 243

Housing used to observe gravitation effects on specimens embedded in support media, such as agar, supports microbial specimens vertically for time-lapsed cinemicrographic studies. Procedure cannot be performed with conventional microscopes which see specimens in horizontal plane only.

B79-10232

IMPROVED CAPACITIVE EKG ELECTRODE

J. L. DAY, M. E. GRIFFITH (Texas Tech Univ.), W. M. PORTNOX (Texas Tech Univ.), and L. J. STOTTS (Texas Tech Univ.)

Dec. 1979

MSC-18321

Vol. 4, No. 2, p. 244

Light, compact electrode monitors heart signals through burn ointment and requires no electrolyte paste for coupling to skin. Innovation is useful because of its ability to monitor heart condition of burn victims.

B79-10233

LOW-DOSE TOTAL-BODY-CALCIUM ANALYSIS

T. K. LEWELLEN (Washington Univ.) and W. B. NELP (Washington Univ.)

Dec. 1979 See also NASA-CR-151675 (N78-22696)

MSC-18282

Vol. 4, No. 2, p. 245

Report details technique for measuring total body calcium by collecting exhaled ^{37}Ar gas after exposure of patients to 14-MeV neutrons. Summary for theoretical basis of technique is presented.

B79-10234

ANTHROPOMETRIC SOURCEBOOK

R. L. BOND, J. T. JACKSON, A. J. LOUVIERE, and W. E. THORNTON

Dec. 1979 See also NASA-RP-1024 (N79-11734); NASA-RP-1024 (N79-13711); NASA-RP-1024 (N79-13712)

MSC-18500

Vol. 4, No. 2, p. 245

Three volume 'Anthropometric Source Book' contains large body of anthropometric data, design information, and references. Subjects covered include variability in body size, mass distribution properties of human body, arm and leg reach, joint motion and numerous other materials.

B79-10235**ANALYZING WATER RESOURCES**

Innovator not given (Ecosystems International, Inc.) Dec. 1979 See also NASA-CR-150467 (N78-13509)

M-FS-25104

Vol. 4, No. 2, p. 245

Report on water resources discusses problems in water measurement demand, use, and availability. Also discussed are sensing accuracies, parameter monitoring, and status of forecasting, modeling, and future measurement techniques.

B79-10374**IMPROVEMENT OF CAT SCANNED IMAGES**

E. ROBERTS, JR.

Apr. 1980 See also NASA-TM-78974 (N78-31690); NASA-TN-D-8529 (N77-29539)

LEWIS-13276

Vol. 4, No. 3, p. 389

Digital enhancement procedure improves definition of images. Tomogram is generated from large number of X-ray beams. Beams are collimated and small in diameter. Scanning device passes beams sequentially through human subject at many different angles. Battery of transducers opposite subject senses attenuated signals. Signals are transmitted to computer where they are used in construction of image on transverse plane through body.

B79-10375**IMPROVED OPTICS FOR AN ULTRACENTRIFUGE**

C. G. MILLER (Caltech) and J. B. STEPHENS (Caltech)
Apr. 1980

NPO-13657

Vol. 4, No. 3, p. 390

Ultracentrifuge is important tool in study of polymers, biomolecules, and cell structures. In typical ultracentrifuge rotor supports pair of optically matched vials; one contains sample mixed in solvent, and other is reference that contains only solvent. Doubleslit optical system, transverse to rotor, creates interference pattern on photographic plate each time vials pass through optics. Medium in sample vial displaces interference maximums such that shift gives measurement of density distribution along length of sample.

B79-10376**IMPROVED MICROBIAL-CHECK-VALVE RESINS**

G. V. COLOMBO (Umpqua Research Co.) and D. F. PUTNAM (Umpqua Research Co.)

Apr. 1980 See also NASA-CR-151678 (N78-22719); (NASA-CR-151843 (N79-11733)

MSC-18377

Vol. 4, No. 3, p. 392

Improved microbial-check-valve resins have been tested for their microbicidal effectiveness and long-term stability. Resins give more stable iodine concentrations than previous preparations and do not impart objectionable odor or taste to treated water. Microbial check valve is small cylindrical device, packed with iodide-saturated resin, that is installed in water line where contamination by micro-organisms is to be prevented. Prototype microbial check valve was tested for stability and performance under harsh environmental conditions. Effectiveness was 100 percent at 35 deg, 70 deg, and 160 deg F (2 deg, 21 deg, and 71 deg C).

B79-10377**COMPUTER MEASUREMENT OF ARTERIAL DISEASE**

J. ARMSTRONG (Caltech), R. H. SELZER (Caltech), R. BARNDT (Univ of Southern Calif.), D. H. BLANKENHORN (Univ of Southern Calif.), and S. BROOKS (Univ. of Southern Calif.)

Apr. 1980

NPO-14266

Vol. 4, No. 3, p. 393

Image processing technique quantifies human atherosclerosis by computer analysis of arterial angiograms. X-ray film images are scanned and digitized, arterial shadow is tracked, and several quantitative measures of lumen irregularity are computed. In other

tests, excellent agreement was found between computer evaluation of femoral angiograms on living subjects and evaluation by teams of trained angiographers.

B79-10515**INDIRECT MICROBIAL DETECTION**

J. R. WILKINS

Jun. 1980

LANGLEY-12520

Vol. 4, No. 4, p. 515

Indirect method for detection of microbial growth utilizes flow of charged particles across barrier that physically separated growing cells from electrodes and measures resulting difference in potential between two platinum electrodes. Technique allows simplified noncontact monitoring of all growth in highly infectious cultures or in critical biochemical studies.

B79-10516**EXTRACTING TRACE SUBSTANCES FROM BIOLOGICAL FLUIDS**

A. ZLATKIS (Univ. of Houston)

Jun. 1980

MSC-18522

Vol. 4, No. 4, p. 516

Apparatus is used as aid in extraction of trace amounts of volatile organics from biological fluids. 'Transervaporator' makes it possible to prepare volatile fraction for analysis by high-resolution gas chromatography.

B79-10517**MONITORING FETAL PH BY TELEMETRY**

A. BLUM, T. DONAHOE, M. D. JHABVALA, and W. RYAN

Jun. 1980

GSFC-12507

Vol. 4, No. 4, p. 517

Telemetry unit has been developed for possible use in measuring scalp-tissue pH and heart rate of unborn infant. Unit radius data to receiver as much as 50 ft. away. Application exists during hours just prior to childbirth to give warning of problems that might require cesarean delivery.

B79-10518**TRIFUNCTIONAL TRANSDUCER FOR MYOCARDIAL MONITORING**

V. H. CULLER (Caltech), C. FELDSTEIN (Caltech), G. W. LEWIS (Caltech), and S. MEERBAUM (Sinai Medical Center)

Jun. 1980

NPO-14329

Vol. 4, No. 4, p. 517

Prototype myocardial transducer simultaneously monitors internal force, displacement, and thickness of heart muscle fiber within localized area of heart muscle. Transducer can be placed in area less than 1.5 by 4 mm.

06 MECHANICS

B79-10086**CONTAINERLESS HIGH-TEMPERATURE CALORIMETER**

L. L. LACY, D. B. NISEN, and M. B. ROBINSON

Aug. 1979

M-FS-23923

Vol. 4, No. 1, p. 89

Samples are heated by electron bombardment in high-temperature calorimeter that operates from 1,000 to 3,600 C yet consumes less than 100 watts at temperatures less than 2,500 C. Contamination of samples is kept to minimum by suspending them from wire in vacuum chamber. Various sample slopes such as wires, disks, spheres, rods, or irregular bodies can be accommodated and only about 100 ng of samples are needed for accurate measurements.

B79-10087**OBTAINING AN ELECTRICAL OUTPUT FROM A MECHANICAL FLOWMETER**

W. T. POWERS

06 MECHANICS

Aug. 1979

M-FS-23958

Vol. 4, No. 1, p. 90

Circuit using optical sensor, low power counting electronics, one clip digital-to-analog converter and operational amplifier converts mechanical readout of water, gas, fuel oil or power meter to analog signal suitable for online processing.

B79-10088

DIFFERENTIAL OIL FLOWMETER

W. T. POWERS

Aug. 1979

M-FS-23959

Vol. 4, No. 1, p. 91

Difference in oil flow volume through two mechanical flowmeters is converted to analog signal by simple inexpensive circuit. Circuit can be implemented with only minor changes to conventional oil flowmeters and used to measure fuel consumed by oil fired furnace or water heater.

B79-10089

BIDIRECTIONAL FLUID-FLOW MONITOR

S. L. BARAJAS (Rockwell International Corp.)

Aug. 1979

MSC-16762

Vol. 4, No. 1, p. 92

Bidirectional fluid-flow monitor detects flow rates as low as 0.1 gal/min (0.41/min) and operates at temperatures up to 350 F (177 C) and at pressures to 500 psig (3.6 X 10 to the sixth power N/M squared). Monitor shows 'no flow' or 'maximum flow' conditions and approximately indicates immediate flow rates.

B79-10090

ELECTRICAL INDICATION OF AIRFLOW RATE

C. MURRISH (Life Sciences Engineering)

Aug. 1979

M-FS-23873

Vol. 4, No. 1, p. 92

Adaption of gas-flow measurement technique originally developed by C. C. Thomas in 1911 is used for temperature measurements which are easily converted to electrical signals.

B79-10091

NONDESTRUCTIVE PULL TESTER

A. LEVY (Hughes Aircraft Co.)

Aug. 1979

MSC-18329

Vol. 4, No. 1, p. 93

Quality control of welded electric wires is improved with easy-to-use tool applying small constant pull force to weldment (typically less than one-twentieth force required to pull weld apart).

B79-10092

PUSH TEST FOR SWITCH WELDS

C. J. TORBORG (Honeywell, Inc.)

Aug. 1979

M-FS-25027

Vol. 4, No. 1, p. 94

Pencil-like tool that applies low predetermined force, may be used to individually test switch welds for identification of poor or marginal welds without harming good ones.

B79-10093

CHECKING WELD PENETRATION

D. I. MACFARLANE (Rockwell International Corp.)

Aug. 1979

M-FS-19396

Vol. 4, No. 1, p. 95

Fused wire in weld root area verifies weld penetration in electron-beam-welded joints. Method could be used in automotive, aircraft, and machinery manufacturing when electron-beam-welds cannot be inspected ultrasonically.

B79-10094

ULTRASONIC GRATING CHECKS ELECTRON-BEAM WELDS

H. A. MITCHELL (Rockwell International Corp.)

Aug. 1979

M-FS-19422

Vol. 4, No. 1, p. 95

Remote inspection technique uses reflectance of ultrasonic waves from machined steps in root area of electron beam welds to indicate sound or faulty welds.

B79-10095

ACCURATE MEASUREMENTS OF MASS AND CENTER OF MASS

E. Y. CHOW and M. R. TRUBERT

Aug. 1979 See also NASA-CR-156130 (N78-20177)

NPO-14428

Vol. 4, No. 1, p. 96

Object is measured for mass and center of mass with accuracies of 0.01% and 0.14% respectively, using method that eliminates errors in alignment, leveling, and calibration. Method is applied to scientific instruments, recorder turntables, flywheels, and other devices that require precise balancing.

B79-10096

MEASURING RESISTANCE OR CONDUCTANCE OF INSULATORS

H. S. MAY (Rockwell International Corp.)

Aug. 1979

MSC-18132

Vol. 4, No. 1, p. 98

Device protects stable fixture for holding electrodes against specimen conductance or resistance measurement with substantially less labor and expense than previous methods.

B79-10097

LASER ALIGNMENT OF LARGE ASSEMBLIES

W. S. CAZARES (Rockwell International Corp.) and D. D. KERN (Rockwell International Corp.)

Aug. 1979

MSC-19346

Vol. 4, No. 1, p. 99

Electronically leveled laser instrument, incorporating special tiltmeter-controlled laser alignment transit, simplifies alignment of large structure. System operated from single alignment reference tower saves time and costs in assembling of structures.

B79-10098

MEASURING THE THICKNESS OF PLASTIC FILMS

K. C. DONOHUE and T. WYDEVEN, JR.

Aug. 1979

ARC-11219

Vol. 4, No. 1, p. 100

Optical instrument measures thickness of translucent and transparent sheets in thickness range from 2 to 8 microns by monitoring attenuation of light as it passes through sheet.

B79-10099

TROUBLESHOOTING PLATED-WIRE MEMORIES

C. M. BAKER (Honeywell, Inc.), T. M. BRIGHT (Honeywell, Inc.), and R. C. CONSTABLE (Honeywell, Inc.)

Aug. 1979

M-FS-23903

Vol. 4, No. 1, p. 100

Faults in plated wire memories are identified and located from outside of system by applying electrical impulses and analyzing their reflectance in technique of Time-Domain Reflectometry (TDR). Intermittent faults are easier to find because memory system is not disturbed by probing or disassembly.

B79-10100

DETERMINATION OF TOTAL SURFACE REFLECTIVITY

D. J. DESMET (Univ. of Alabama), A. J. JASON (Univ. of Alabama), and A. C. PARR (Univ. of Alabama)

Aug. 1979

M-FS-25024

Vol. 4, No. 1, p. 102

Method of measuring total reflectance employs relatively inexpensive reflectometer with gold-coated hemispherical reflector. Light sources may be tungsten lamp for visible region, or Globar lamp for infrared.

B79-10101

CHARACTERIZING GLASS FRITS FOR SLURRIES

H. N. NAKANO (Lockheed Missiles and Space Co.)

Aug. 1979

MSC-18322

Vol. 4, No. 1, p. 103

Glass frit can be mixed with consistently reproducible properties even from different batches of glass frit using technique to measure one quantity that determines integrated properties of frit for combination with given liquid.

B79-10102

TEST-CONFIGURATION IDENTIFIERS

W. D. SUMRALL (IBM Corp.)

Aug. 1979

KSC-11087

Vol. 4, No. 1, p. 103

Distributed computer system, which allows great deal of interaction within totally synchronized environment, comprises test system that presents systematic approach for identifying test configurations for large complex systems such as submarines, aircraft, or air traffic controllers.

B79-10103

ANTITHEFT CONTAINER FOR INSTRUMENTS

J. J. KERLEY, JR.

Aug. 1979

GSFC-12399

Vol. 4, No. 1, p. 104

Antitheft container is used to prevent theft of calculators, portable computers, and other small instruments. Container design is simple and flexible enough to allow easy access to display or input systems of instruments, while not interfering with power input to device.

B79-10104

EXTENDING THE RANGE OF LEAK DETECTORS

M. E. BURR (Rockwell International Corp.)

Aug. 1979

M-FS-19411

Vol. 4, No. 1, p. 105

Pressure-gage calibration, mass-spectrometer leak detector measures leakage rates up to 300 times greater than its normal limit. Approach utilizes constant-volume displacement characteristic of mechanical vacuum pump. Vacuum system must be small for calibration measurement validity and reduction of outgassing.

B79-10105

ATTACHING STRAIN TRANSDUCERS TO FRAGILE MATERIALS

M. F. DUGGAN (Lockheed Missiles and Space Co.)

Aug. 1979

MSC-16580

Vol. 4, No. 1, p. 106

A-shaped clamp prevents damage to thin, brittle specimens and supports displacement transducer away from heated zone. Also it defines reference points for strain measurement on specimen surface thus preventing specimen cracking due to unequal thermal expansion between clamp and holder.

B79-10106

AUDIBLE MONITOR FOR ELECTROPLATING

E. A. BUROWICK (Rockwell International Corp.)

Aug. 1979

M-FS-19333

Vol. 4, No. 1, p. 106

'No buzzer' indicates early problem in electroplating when parts are properly immersed into electroplating bath. Buzzer sounds when current flows through part; however, if current is cut, buzzer stops warning that parts must be removed and refinished thus preventing unnecessary waste of electrical energy and labor.

B79-10107

INSPECTING CRACKS IN FOAM INSULATION

L. W. CAMBELL (Martin Marietta Corp.) and G. K. JUNG

Aug. 1979

M-FS-23799

Vol. 4, No. 1, p. 107

Dye solution indicates extent of cracking by penetrating crack and showing original crack depth clearly. Solution comprised of methylene blue in denatured ethyl alcohol penetrates cracks completely and evaporates quickly and is suitable technique for usage in environmental or structural tests.

B79-10108

MEASURING INSULATION THICKNESS

D. M. MUNN (Martin Marietta Corp.)

Aug. 1979

M-FS-23798

Vol. 4, No. 1, p. 108

Calibrated eddy-current meter measures thickness of thermal insulation on metal substrates with specially designed adapters;

for example, thickness of fiberglass parts for boats or automobiles. Technique is particularly useful for sprayed-on insulation.

B79-10109

BURN-TEST APPARATUS FOR FIBER COMPOSITES

W. L. DOWLER, J. D. QUINN, K. N. RAMOHALLI, and D. E. UDLOCK

Aug. 1979

NPO-14578

Vol. 4, No. 1, p. 109

Burn-test apparatus made from conductive metal grid and indicator lamp monitors release of conductive carbon fibers from specimen of carbon-reinforced composites exposed to flame. Procedure is more sensitive than photographing or physically trapping and counting fibers.

B79-10110

MEASURING MOISTURE IN THE ATMOSPHERE

D. L. JOHNSON

Aug. 1979 See also NASA-TM-78190 (N78-31405)

M-FS-25032

Vol. 4, No. 1, p. 110

Report describes instruments for measuring moisture in air by categorizing instruments according to their thermodynamic, hygroscopic, condensation, absorption, diffusion, and optical properties.

B79-10111

FRICTION COEFFICIENTS OF PTFE BEARING LINER

C. M. DANIELS (Rockwell International Corp.)

Aug. 1979

M-FS-19389

Vol. 4, No. 1, p. 110

Data discusses frictional characteristics of PTFE (polytetrafluoroethylene) under temperature extremes and in vacuum environment. Tests were also run on reduced scale hardware to determine effects of vacuum. Data is used as reference by designers of aircraft-control system rod-end bearings and for bearings used in polar regions.

B79-10112

AIRCRAFT MISSION ANALYSIS

D. S. HAUGE (Aerophysics Research Center) and H. L. ROSENDAAL (Aerophysics Research Center)

Aug. 1979

LANGLEY-12299

Vol. 4, No. 1, p. 110

Aircraft missions, from low to hypersonic speeds, are analyzed rapidly using the FORTRAN IV program NSEG. Program employs approximate equations of motion that vary in form with type of flight segment. Takeoffs, accelerations, climbs, cruises, descents, decelerations, and landings are considered.

B79-10113

DYNAMIC SIMULATION AND STABILITY ANALYSIS

H. P. FRISCH

Aug. 1979

GSFC-12422

Vol. 4, No. 1, p. 111

Dynamic Interaction Simulation of Controls and Structure (DISCOS) program was developed for dynamic simulation and stability analysis of passive and actively controlled spacecraft. Program is written in FORTRAN IV for batch execution and requires access to finite-element structures program as NASTRAN for flexible-body input data.

B79-10114

GODDARD TRAJECTORY DETERMINATION

B. DIXON

Aug. 1979

GSFC-11946

Vol. 4, No. 1, p. 112

Goddard Trajectory Determination System (GTDS), programs designed to support Earth, lunar and interplanetary missions are used as research and development tool. Program displays research and development used in trajectory determination, preflight and postflight analyses, simulation of tracking data, ephemeris generation, and related tasks.

B79-10115

MINICOMPUTER VERSION OF SPAR

O. O. STORAASLI

Aug. 1979

LANGLEY-12370; LANGLEY-12371 Vol. 4, No. 1, p. 113

SPAR (Structural Performance Analysis and Redesign Program), powerful tool for efficiently solving finite-element structural analysis problems, has been implemented on minicomputers. System analyzes stress, buckling, vibration, and thermal loads of large linear finite-element structural models.

B79-10116**HINGE-CONNECTED RIGID BODIES**

C. E. FLEISCHER and P. W. LIKINS

Aug. 1979

NPO-11964

Vol. 4, No. 1, p. 113

Package of subroutines solve minimum dimension sets of discrete coordinate equations of motion for arbitrary number of hinge-connected rigid bodies assembled in tree topology.

B79-10117**CENTROIDS, MOMENTS, AND RADII OF GYRATION**

R. W. PATCH

Aug. 1979

LEWIS-12765

Vol. 4, No. 1, p. 114

Computer program finds area, centroid, moments of inertia, product of inertia, and radii of gyration of closed curve given in graphical form such as on engineering drawing or strip chart. System is applicable when finding volume and center of gravity for liquid tanks, or for detecting buoyancy of hull sections.

B79-10236**ACCURATE DETERMINATION OF WORK IN THREE-POINT BEND TESTS**

R. J. BUZZARD and D. M. FISHER

Dec. 1979 See also NASA-TM-X-73596(N77-19486)

LEWIS-13034

Vol. 4, No. 2, p. 249

Article presents procedure where correction curve accounts for coincidental displacement and simplifies data analysis in three point bend test in field of materials testing. Method is applicable to any test in above field regardless of load displacement.

B79-10237**IMPROVED DISPLACEMENT MEASUREMENT IN BEND TESTING**

R. J. BUZZARD and D. M. FISHER

Dec. 1979 See also NASA-TM-X-73596(N77-19486)

LEWIS-13035

Vol. 4, No. 2, p. 250

Removable spacers extend displacement range and increase accuracy. Innovation is needed to accurately measure displacement between ram and load applicator of compression testing machine during bend testing.

B79-10238**DISPLACEMENT GAGE MODIFIED FOR MULTIPLE MEASUREMENTS**

R. J. BUZZARD and D. M. FISHER

Dec. 1979 See also NASA-TM-73731(N77-30500)

LEWIS-13036

Vol. 4, No. 2, p. 251

Clip-in gages used in fracture toughness testing are modified to permit acquisition of additional displacement data. With innovation, displacement is measured simultaneously at several locations on face of test specimen.

B79-10239**MEASURING THE PERMITTIVITY OF GASES AND AEROSOLS**

W. J. TRETT

Dec. 1979

KSC-11090

Vol. 4, No. 2, p. 252

Two-coupler microwave technique measures complex permittivity utilizing waveguide which encloses gas or aerosol. Using technique, blower continuously circulates substances to keep them homogeneous.

B79-10240**IMPROVED SPLIT-FILM VECTOR ANEMOMETER**

J. SCHEIMAN

Dec. 1979

LANGLEY-12391

Vol. 4, No. 2, p. 253

Split-film vector anemometer accurately measures magnitude and direction of fluid flow velocity in three-dimensional space using only one of three split films in three-prong split-film system. With procedure, one sensor develops all data previously required by three.

B79-10241**TESTING PANELS IN SHEAR AND BIAxIAL COMPRESSION**

J. K. NEARY (Rockwell International Corp.)

Dec. 1979

MSC-16132

Vol. 4, No. 2, p. 254

Hydraulic jacks simultaneously apply torsion, axial compression, and lateral compression to structural panels. Jacks are suitable for testing large panels used in aircraft, lightweight trucks, and buses.

B79-10242**PREDICTING THE WET STRENGTH OF LAMINATES**

R. E. BOHLMAN (McDonnell Douglas Corp.)

Dec. 1979

MSC-18022

Vol. 4, No. 2, p. 255

Graphite/epoxy strengths at various moisture contents are estimated by extrapolating from small data base. With procedure, massive testing is unnecessary because advantage is taken of large data base already available for moisture content in laminates.

B79-10243**NONCONTACT STRAIN MEASUREMENT**

P. T. BIZON and F. D. CALFO

Dec. 1979 See also NASA-TM-73886(N78-19161)

LEWIS-13091

Vol. 4, No. 2, p. 256

Electro-optical extensometer containing optical and electronic components measures displacement in simulated turbine blade thermally cycled into and out of hot-gas stream. Innovation is useful in obtaining accurate strain histories for components subjected to severe thermal environments and other environmental changes.

B79-10244**THERMOGRAPHIC INSPECTION OF WELDED CONTACTS**

G. L. WORKMAN (North Alabama Scientific & Engineering Consultants, Inc.)

Dec. 1979

M-FS-25093

Vol. 4, No. 2, p. 257

Good and poor-quality welds are identified by digitized thermography, an approach which improves reliability of solar arrays on space probes.

B79-10245**NONDESTRUCTIVE WELD TEST BY HOLOGRAPHY**

M. PERRY (North Alabama Scientific & Engineering Consultants, Inc.) and G. L. WORKMAN (North Alabama Scientific & Engineering Consultants, Inc.)

Dec. 1979

M-FS-23826

Vol. 4, No. 2, p. 258

Hologram with magnification locates poorly bonded pads on solar cell arrays. Innovation is useful for testing assembly of large solar-cell arrays accurately and nondestructively.

B79-10246**DIAZO TECHNIQUES FOR REMOTE SENSOR DATA ANALYSIS**

S. MOUNT (Missouri Univ. - Rolla) and L. E. WHITEBAY (Missouri Univ. - Rolla)

Dec. 1979 See also NASA-CR-2953(N78-17447)

M-FS-25110

Vol. 4, No. 2, p. 259

Cost and time to extract land use maps, natural-resource surveys, and other data from aerial and satellite photographs are reduced by diazo processing. Process can be controlled to enhance features such as vegetation, land boundaries, and bodies of water.

B79-10247**A THERMOCOUPLE FOR HOT, OXIDIZING ENVIRONMENTS**

R. V. JENKINS

Dec. 1979

LANGLEY-12229

Vol. 4, No. 2, p. 260

Thermocouple enclosed in nonoxidizing thermally conductive metal provides temperature probe which is made for very hot, highly oxidizing environments. Approach makes temperature measurement in hot, oxidizing atmospheres much easier task.

B79-10248**AIRPLANE STABILITY PROGRAMS FOR POCKET CALCULATORS**

W. L. SHERMAN

Dec. 1979 See also NASA-TM-78678(N78-30138)

LANGLEY-12479

Vol. 4, No. 2, p. 261

Three general-use programs and three stability programs are written for pocket calculators.

B79-10249**CONTROLLING A WIDE RANGE OF FLOW RATES**

G. S. PERKINS (Caltech)

Dec. 1979

NPO-14312

Vol. 4, No. 2, p. 262

Servo-operated valve and two flowmeters allow accurate control over 1,900:1 flow-rate range. It was developed as part of laboratory instrument for measuring properties of confined fluids under conditions analogous to those encountered in deep drilling operations.

B79-10250**NONINTERFERING SUPPORT FOR AERODYNAMIC MODELS**

S. M. DOLLYHIGH, C. M. JACKSON, JR., and D. S. SHAW

Dec. 1979

LANGLEY-12441

Vol. 4, No. 2, p. 262

Metric half-span support increases accuracy of subsonic and supersonic wind-tunnel measurements.

B79-10251**SOLAR-POWERED JET REFRIGERATOR**

V. W. CHAI (Caltech) and F. L. LANSING (Caltech)

Dec. 1979

NPO-14550

Vol. 4, No. 2, p. 263

Design criteria are easily evaluated by tool. Thermodynamic analysis of solar-powered vapor-jet refrigerator combines important performance parameters in nomogram that assist design of practical system. Projected coefficients of performance for different ejector configurations, working fluids, and other design variables are easily obtained from nomogram.

B79-10252**ESTIMATING EFFECTS OF ACCIDENTAL PROPELLANT EXPLOSIONS**

P. M. ORDIN, W. E. BAKER (Southwest Research Center), P. K. KULESZ (Southwest Research Center), P. K. MOSELEY (Southwest Research Center), V. B. PARR (Southwest Research Center), R. E. RICKER (Southwest Research Center), L. M. VARGAS (Southwest Research Center), and P. S. WESTINE
Dec. 1979 See also NASA-CR-3023(N79-10226); NASA-CR-134906(N76-19296)

LEWIS-13247

Vol. 4, No. 2, p. 265

Workbook assesses magnitudes and effects of blasts and fragments from ground system explosions. It provides designer and safety engineer with rapid methods for predicting damage and hazards from explosions of liquid-propellant and compressed-gas vessels used in ground storage, transport, and handling.

B79-10253**FLOW FIELDS IN SUPERSONIC INLETS**

V. L. SORENSEN

Dec. 1979

ARC-11098

Vol. 4, No. 2, p. 265

Flow fields in two and three dimensional axisymmetric supersonic inlets are calculated with computer program that uses method of characteristics to compute array of points in flow field. At each point, local pressure, local Mach number, local flow angle, and static pressure are calculated. Program can be used to design and analyze supersonic inlets by determining surface compression rates and throat flow properties.

B79-10254**CHARACTERISTICS OF WING/BODY/TAIL CONFIGURATIONS**

M. F. E. DILLENUS (Nielsen Engineering & Research, Inc.), F. K. GOODWIN (Nielsen Engineering & Research, Inc.), D. M. KLINE (Nielsen Engineering & Research, Inc.), and M. R. MENDENHALL (Nielsen Engineering & Research, Inc.)

Dec. 1979

ARC-11224

Vol. 4, No. 2, p. 266

Package of computer programs determine longitudinal aerodynamic characteristics of wing/body/tail combinations including effects of nonlinear aerodynamics of components and interference between components.

B79-10255**ADVANCED-PANEL PILOT CODE**

G. R. BILLS (Boeing Commercial Airplane Co.), M. A. EPTON (Boeing Commercial Airplane Co.), and F. T. JOHNSON (Boeing Commercial Airplane Co.)

Dec. 1979

ARC-11278

Vol. 4, No. 2, p. 266

Numerical research program helps establish 'proof-of-concept' for newly developed higher-order panel method applicable to both subsonic and supersonic flows about nearly-arbitrary aircraft configurations. It is intended to solve variety of boundary-value problems in steady-subsonic or supersonic inviscid flow.

B79-10256**ARBITRARY AIRCRAFT-GEOMETRY GENERATOR**

C. L. W. EDWARDS, W. J. SMALL, and S. H. STACK

Dec. 1979

LANGLEY-12515

Vol. 4, No. 2, p. 267

Computer program helps designers to generate detailed configuration geometry with much flexibility in choices of configurations and details of description. Input requirements, program turnaround time, and costs are kept low. It consists of routines that generate fuselage and planar-surface (winglike) geometries and routine that determines true intersection of all components with fuselage.

B79-10257**RELIABILITY OF NONDESTRUCTIVE EVALUATION DATA**

J. C. COUCHMAN (General Dynamics Corp.) and B. G. W. YEE (General Dynamics Corp.)

Dec. 1979

LEWIS-12908

Vol. 4, No. 2, p. 267

Program calculates probability of defects at selected confidence levels from nondestructive evaluation data. It provides alternate method of grouping sample data to obtain reasonable value for lower confidence limit with small sample size.

B79-10378**IMPROVED FLAW-DETECTION METHOD**

R. J. PLATT, JR.

Apr. 1980

LANGLEY-11866

Vol. 4, No. 3, p. 397

Holographic detection of unbonded or delaminated surfaces of materials and structures is improved by using helium instead of air in vacuum test chamber. Helium has index of refraction closer to vacuum (unity) than air. Therefore changes in chamber pressure during test do not alter index of refraction as much as they do with air. With air, much of detail is lost, particularly in curved areas.

B79-10379**SOLAR-CELL DEFECT ANALYZER**

M. K. GAUTHIER (Caltech), E. L. MILLER (Caltech), and A. SHUMKA (Caltech)

Apr. 1980

NPO-14476

Vol. 4, No. 3, p. 398

Laser-Scanning System pinpoints imperfections in solar cells. Entire solar panels containing large numbers of cells can be scanned. Although technique is similar to use of scanning electron microscope (SEM) to locate microscopic imperfections, it differs in that large areas may be examined, including entire

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solar panels, and it is not necessary to remove cover glass or encapsulants.

B79-10380

DETECTING LEAKS IN VACUUM BAGS

E. E. CARLSTROM (Lockheed Missiles and Space Co., Inc.)

Apr. 1980

MSC-18423

Vol. 4, No. 3, p. 399

Small leaks in vacuum bag can be readily detected by eye, using simple chemical reaction: combination of ammonia and acetic acid vapors to produce cloudy white smoke. Technique has been successfully used to test seam integrity and to identify minute pinholes in vacuum bag used in assembly of ceramic-tile heat shield for Space Shuttle Orbiter.

B79-10381

CRACK-OPENING DISPLACEMENT TRANSDUCER

R. A. SIMONDS (Vought Corp.)

Apr. 1980

LANGLEY-12485

Vol. 4, No. 3, p. 400

Crack-opening displacement transducer consists of 30 deg cone, coil spring, and linear-displacement transducer. Conical probe is used to measure crack opening. Cone is pressed firmly into crack by spring. As applied load causes crack to open up, cone is pushed further into it. Movement of cone, and thus crack growth, is monitored by linear-displacement transducer. Method gives more accurate measurement of crack-opening displacement of very narrow slots.

B79-10382

PEEL TESTING METALIZED FILMS

L. BLIVINS (Rockwell International Corp.) and T. SMITH (Rockwell International Corp.)

Apr. 1980

NPO-14672

Vol. 4, No. 3, p. 401

Fimsy ultrathin sheets are mounted on glass for peel-strength measurements. Technique makes it easier to perform peel tests on metalized plastic films. Technique was developed for determining peel strength of thin (1,000 Å) layers of aluminum on Kapton film. Previously, material has been difficult to test because it is flimsy and tends to curl up and blow away at slightest disturbance. Procedure can be used to measure effects on metalization bond strength of handling, humidity, sunlight, and heat.

B79-10383

GAGE FOR 3-D CONTOURS

C. C. HAYNIE (Rockwell International Corp.)

Apr. 1980

MSC-19589

Vol. 4, No. 3, p. 402

Simple gage, used with template, can help inspectors determine whether three dimensional curved surface has correct contour. Gage was developed as aid in explosive forming of Space Shuttle emergency-escape hatch. For even greater accuracy, wedge can be made of metal and calibrated by indexing machine.

B79-10384

AUTOMATIC INSPECTION OF SILICON WAFERS

M. MARTIN (TAI, Inc.)

Apr. 1980

M-FS-25124

Vol. 4, No. 3, p. 403

Laser machine scans wafers for contaminating particles which cause open circuits, short circuits, and other defects in integrated circuits and transfers good wafers to integrated circuit processing equipment. Machine is faster and more accurate than human operator using lightfield/dark field microscope.

B79-10385

FAIRED INSTRUMENTATION FOR AERODYNAMIC TESTS

W. C. LONG and M. L. WILLIAMS

Apr. 1980

LANGLEY-11201

Vol. 4, No. 3, p. 404

Streamlined package is installed and removed without altering aerodynamic properties of structure being tested. Method uses lightweight materials so that blade balance is maintained.

B79-10386

DEFLECTOMETER FOR PRECRACKED CHARPY AND JIC BEND TESTS

R. T. BUBSEY and M. H. JONES

Apr. 1980

LEWIS-13090

Vol. 4, No. 3, p. 404

Deflectometer uses ASTM Standard Test E-399 clip-in displacement gage as sensing element. Gage is available in most fracture testing laboratories and has good sensitivity and accuracy.

B79-10387

ZONE-CONTROLLED RESISTANCE HEATER

P. R. BAGWELL (Vought Corp.)

Apr. 1980

MSC-16251

Vol. 4, No. 3, p. 406

Geodesic array of heaters powered by separate electrical supply unit and silicon controlled-rectifier (SCR) control unit produces controlled temperatures over independent zones. Arrays conform to and enclose almost any shape with close thermal coupling and are programmed to reproduce almost any desired time/temperature distribution.

B79-10388

ENERGY SAVER FOR INDUSTRIAL LIGHTING

J. ARLINE (Warren and Williams Associates, Inc.), J. LAPALME (Warren and Williams Associates, Inc.), and C. WARREN (Warren and Williams Associates, Inc.)

Apr. 1980

KSC-11103

Vol. 4, No. 3, p. 407

Electronic controller switches lights on or off in response to amount of sunlight available. Is applicable in offices and industrial installations where electrical energy is wasted by using artificial light in sunlit areas. Device utilizes electronic monitor that varies artificial lighting according to amount of sunlight in given area.

B79-10389

COMPACT THERMOCOUPLE REFERENCE FOR VACUUM CHAMBERS

J. C. FAY (Rockwell International Corp.) and J. D. GLOVER (Rockwell International Corp.)

Apr. 1980

MSC-19651

Vol. 4, No. 3, p. 408

Self-contained reference installed inside vacuum chamber include its own heater and power controller. Setup is less costly than approach utilizing many thermocouples.

B79-10390

FIBER-OPTIC PROXIMITY SENSOR

A. K. BEJCZY (Caltech), W. A. HERMANN (Caltech), and H. C. PRIMUS (Caltech)

Apr. 1980

NPO-14653

Vol. 4, No. 3, p. 408

Proximity sensor for mechanical hand of remote manipulator incorporates fiber optics to conduct signals between light source and light detector. Fiber optics are not prone to noise from electromagnetic interference and radio-frequency interference as are sensors using long electrical cables.

B79-10391

SAFETY SHIELD FOR VACUUM/PRESSURE-CHAMBER WINDOWS

R. A. SHIMANSKY and R. SPENCER

Apr. 1980

GSFC-12513

Vol. 4, No. 3, p. 409

Optically-clear shatter-resistant safety shield protects workers from implosion and explosion of vacuum and pressure windows. Plastic shield is inexpensive and may be added to vacuum chambers, pressure chambers, and gas-filling systems.

B79-10392

LIGHTNING PROTECTION FOR AIRCRAFT

F. A. FISHER (General Electric Co.) and J. A. PLUMER (Lightning Technologies, Inc.)

Apr. 1980 See also NASA-RP-100B (N78-11024)

LEWIS-12981

Vol. 4, No. 3, p. 410

Reference book summarizes current knowledge concerning potential lightning effects on aircraft and means available to designers and operators to protect against effects. Book is available because of increasing use of nonmetallic materials in aircraft structural components and use of electronic equipment for control of critical flight operations and navigation.

B79-10393**FAN NOISE-MODE STRUCTURE IN A DUCT**

R. A. LOVE (Pratt and Whitney Aircraft Group), G. F. PICKETT (Pratt and Whitney Aircraft Group), and R. A. WELLS (Pratt and Whitney Aircraft Group)

Apr. 1980 See also NASA-CR-135295 (N78-17066); NASA-CR-135294 (N78-17065); NASA-CR-135293 (N78-17064)

LEWIS-13129

Vol. 4, No. 3, p. 411

Two computer programs help analyst meet low-noise limits on turbofan engines. Microphone Location Program computes optimum locations in turbofan duct for placement of microphones. After tests in first program are run, acoustic phase, amplitude, and pressure are used as inputs in Modal Calculation Program.

B79-10394**ELECTRIC-CAR SIMULATION**

C. P. CHAPMAN (Caltech) and R. A. SLUSSER (Caltech)

Apr. 1980

NPO-14570

Vol. 4, No. 3, p. 411

PARAMET, interactive simulation program for parametric studies of electric vehicles, guides user through simulation by menu and series of prompts for input parameters. Program considers aerodynamic drag, rolling resistance, linear and rotational acceleration, and road gradient as forces acting on vehicle.

B79-10395**PHASE CHANGES IN LIQUID FACE SEALS**

W. F. HUGHES (Carnegie-Mellon Univ.)

Apr. 1980

LEWIS-12994

Vol. 4, No. 3, p. 412

Computer program predicts boiling (phase change) in liquid face seals. Program determines if and when boiling occurs, and calculates location of boiling interface, pressure and temperature profiles, and load.

B79-10396**COUPLED-CAVITY TRAVELING-WAVE TUBES**

D. J. CONNOLLY and T. A. OMALLEY

Apr. 1980

LEWIS-12861

Vol. 4, No. 3, p. 412

Computer program is developed for analysis of coupled cavity traveling waves tubes (TWTs) which are used in variety of radar and communications applications. Programmers can simulate tubes of arbitrary complexity such as input and output couplers and other features peculiar to one or few cavities which may be modeled by correct choices of input data.

B79-10397**NATURAL MODES OF HELICOPTER ROTOR BLADES**

R. E. MINECK (U.S. Army R&T Labs.) and W. H. WELLER (U.S. Army R&T Labs.)

Apr. 1980

LANGLEY-12501

Vol. 4, No. 3, p. 413

Computer program based on Holzer-Myklestad approach calculates coupled vertical, horizontal, and torsional characteristics of wide variety of hub and blade configurations of practical interest. Program is written in FORTRAN IV.

B79-10398**INTERFERING SURFACES IN SUBSONIC, TRANSONIC, AND SUPERSONIC FLOW**

A. M. CUNNINGHAM, JR. (General Dynamics Corp.)

Apr. 1980

LANGLEY-12524

Vol. 4, No. 3, p. 413

Computer program provides analysis method based on kernel-function technique that uses assumed pressure functions with unknown coefficients. With technique, generalized forces are calculated in unsteady flow, and pressure distributions are obtained in steady and unsteady flow.

B79-10399**LOW-ASPECT-RATIO WINGS**

C. E. LAN (Univ. of Kansas Center for Research, Inc.) and S. C. MEHROTRA (Univ. of Kansas Center for Research, Inc.)

Apr. 1980

LANGLEY-12490

Vol. 4, No. 3, p. 414

Computer program predicts aerodynamic characteristics of wings having attached flow across part of wing and vortex flow across remainder. Program also uses quasi-vortex lattice method to formulate wing boundary conditions.

B79-10519**TRIPLE-EXPOSURE HOLOGRAPHY FOR MATERIALS TESTS**

H. K. LIU (Lumin, Inc.)

Jun. 1980

M-FS-25180

Vol. 4, No. 4, p. 521

Theoretical analysis of technique of triple exposure of holographic nondestructive testing shows that significant information can be extracted improving analysis of fringe pattern.

B79-10520**RESONANT-FATIGUE CRACKING APPARATUS**

J. P. DORNER, W. S. PIERCE, and J. L. SHANNON, JR.

Jun. 1980

LEWIS-13037

Vol. 4, No. 4, p. 522

Apparatus produces controlled surface cracks in test specimens. It has been developed and is useful in production of surface cracks of controlled size and shape in fracture specimens. It consists of specially-designed stand-mounted clamping fixture, commercially available pneumatic actuator, and suitable sound-control mufflers.

B79-10521**MEASURING ACOUSTIC PROPERTIES OF MATERIALS AND JET NOZZLES**

P. D. DEAN (Lockheed Aircraft Corp.), H. E. PLUMBLEE (Lockheed Aircraft Corp.), and M. SALIKUDDIN (Lockheed Aircraft Corp.)

Jun. 1980

LEWIS-13265

Vol. 4, No. 4, p. 523

Method measures acoustic properties of sound-absorbent materials and jet-nozzle system. Advantages of impulse method over other methods are that test time and complication are reduced. Results obtained from impulse method have been compared with those from existing methods, both experimental and theoretical, and show excellent agreement.

B79-10522**TIRE-PRESSURE MEASURING CONCEPT**

L. O. ASHMORE (Rockwell International Corp.)

Jun. 1980

MSC-18490

Vol. 4, No. 4, p. 524

External tire-pressure measuring concept involves device that applies external load to tire wall to measure its internal pressure. Method promises to be faster than conventional tire-pressure checks, speeding up turnaround time for aircraft. Method prevents air leakage that occurs when pressure is measured through tire valve. Device is used to measure tire pressures on land vehicles.

B79-10523**SYNTHETIC SEAWATER AS STRESS-CORROSION TEST MEDIUM**

T. S. HUMPHRIES and E. E. NELSON

Jun. 1980 See also NASA-TM-X-64733(N73-22062)

M-FS-22706

Vol. 4, No. 4, p. 525

Seawater minimizes pitting corrosion of aluminum-alloy test samples. Of three corrosion-inhibiting methods evaluated using (a) chromate inhibitors in saltwater, (b) surface treating sample via anodizing or alodine treatment, and (c) synthetic seawater, synthetic seawater was most effective test medium, since it is more uniform than fresh seawater.

B79-10524**DETECTING INSULATION DEFECTS IN METAL/PLASTIC FILMS**

R. N. BUGGLE (Honeywell, Inc.)

Jun. 1980

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M-FS-25127

Vol. 4, No. 4, p. 526

Simple apparatus checks insulation between plastic and metal surfaces. Film can be inspected more accurately; apparatus can spot minute electrical contaminants between plastic and metal films. Steel roller connected to high-range ohmmeter is guided over entire plastic area of test sample. Roller weighs 2 lbs. (0.9 kg), which effectively translates into 250-psi (1.76X10 to 6th power -N/sq m) contact pressure at plastic surface sufficient to locate microscopic defects.

B79-10525

ACOUSTICAL MEASUREMENT SEPARATES CORE NOISE AND JET NOISE

S. P. PARTHASARATHY (Caltech)

Jun. 1980

NPO-14698

Vol. 4, No. 4, p. 526

Measuring technique discriminates between jet noise and core noise of jet engine. Results of experimentation confirmed that core noise and jet noise can be separated by examining cross-correlation of far-field microphone signals and that crossover point between core noise and jet noise moves toward higher velocities at higher angles with respect to jet axis.

B79-10526

ONSITE TESTING OF PRESSURE SAMPLING

R. MALLORY (Wyle Laboratories)

Jun. 1980

LANLEY-12428

Vol. 4, No. 4, p. 527

Portable test instrument containing controller, pressure port identification, 5-V power source for transducer excitation, and digital voltmeter to test pressure sampling valves completely, including leak and plug check before, during, or after installation in any location or environment. Controller comprises 117/24-Vac 100-watt transformer, bridge rectifier, capacitive-discharge stepper, and constant voltage source for homing sampling valve. It also includes 5-V regulated power supply and bipolar digital voltmeter having 10-uV resolution.

B79-10527

GRAPHITE/EPOXY-TAPE TEST SPECIMENS

J. L. CUPP (Rockwell International Corp.) and F. S. SPEARS (Rockwell International Corp.)

Jun. 1980

MSC-18495

Vol. 4, No. 4, p. 528

Constructed specimens for transverse tensile testing of unidirectional graphite/epoxy tape is tested more accurately than earlier samples. Specimens are made using unsupported adhesive and commercially-available (e.g., Nomex, or equivalent) honeycomb core. Flexible adhesive and dimensionally stable core eliminate uneven thermal expansion. Tensile strength of tape at various temperatures becomes direct function of applied mechanical stress.

B79-10528

'THREE-DIMENSIONAL' VIBRATION FIXTURE

C. A. SCHUMACHER (Martin Marietta Corp.)

Jun. 1980

MSC-16305

Vol. 4, No. 4, p. 529

Simple cube-shaped fixture reduces vibration-test time to one-third required previously. Three units are supported at once. During one run each unit is tested along one of axes. Units are repositioned on second run for tests along different axes. Three runs complete test; fixture can be set up to test small, lightweight high-production units.

B79-10529

RAPID TESTING OF PULSE TRANSFORMERS

J. GRILLO (Singer Co.)

Jun. 1980

MSC-18202

Vol. 4, No. 4, p. 529

Quality-control testing of pulse transformers is speeded up by method for determining rise time and droop. Instead of using oscilloscope and square-wave generator to measure these characteristics directly, method uses voltmeter and sine-wave generator to measure them indirectly in about one-tenth time. Droop and rise time are determined by measuring input/output voltage ratio at just four frequencies.

B79-10530

DETECTOR VERIFIER FOR CIRCUIT ANALYZERS

D. L. POPE (Rockwell International Corp.) and R. L. WOOTERS (Rockwell International Corp.)

Jun. 1980

MSC-19669

Vol. 4, No. 4, p. 530

Economical tool checks operation of automatic circuit analyzer. Each loop is addressed directly from analyzer console by switching internal analyzer bridge to resistance equal that of connecting cable plus specified limiting test value. Procedure verifies whether detected faults in circuit under test are actually due to analyzer malfunction. Standard-length universal test cables make it possible to shift detector tool from cable to cable without resistance compensation.

B79-10531

RUGGED FAST-RESPONSE TEMPERATURE PROBE

P. L. BAILEY, F. R. LEMOS, and W. C. ROSE

Jun. 1980

ARC-11289

Vol. 4, No. 4, p. 531

Very-sensitive probe uses tungsten sensor wire wrapped around notched electrodes. Design combines ruggedness of earlier but less sensitive probe using very-short sensor wire with very-sensitive but fragile version with sensor wires wrapped around non-conducting frames.

B79-10532

HIGH-TEMPERATURE HIGH-PRESSURE MAGNETIC PICKUP

L. A. AHLBERG (Rockwell International Corp.) and B. R. TITTMANN (Rockwell International Corp.)

Jun. 1980

MSC-18389

Vol. 4, No. 4, p. 532

Magnetic-pickup transducers operate at temperature as high as 1,100 C and pressures in excess of 2.5 kilobars. Transducers obtain simulated seismic data in laboratory experiments at high temperatures and pressure. They also have potential applications in industrial instrumentation for measurements under similarly difficult conditions. Transducers use high-temperature cement to bond parts together and high-temperature-insulated copper or aluminum wire for windings.

B79-10533

CONTROLLING SUBSYNCHRONOUS WHIRL IN TURBOPUMPS

M. D. BLACK (Rockwell International Corp.) and B. F. ROWAN (Rockwell International Corp.)

Jun. 1980

M-FS-19423

Vol. 4, No. 4, p. 533

Active fluidic dampers are proposed for controlling turbopump-shaft whirl. Study indicates that linear variable-bleed detector and linear bistable amplifier are effective in supplying sizable controlled damping forces. Linear bistable device was considered as simplest and most adequate.

B79-10534

MECHANICAL-LOAD INDICATOR

W. T. APPLEBERRY (Rockwell International Corp.)

Jun. 1980

MSC-19511

Vol. 4, No. 4, p. 534

By rotation of washerlike part, mechanical indicator shows when predetermined compression or tension load has been reached. Indicator consists of bolt, sleeve, load-indicating washer, and nut. Besides application as load indicator, device has uses as remote indicator of mechanical action. Rotating washer can also act as sequencer, signaling action to begin upon attainment of certain load. It can be used, for example, to initiate work cycle after stored energy has been built up in hydraulic or pneumatic power equipment. It can also be used as remote, nonelectrical switch in hazardous environments.

B79-10535

ADJUSTABLE HOLDER FOR TRANSDUCER MOUNTING

R. C. DEOTSCH (Rockwell International Corp.)

Jun. 1980

MSC-18371

Vol. 4, No. 4, p. 535

Positioning of acoustic sensor, strain gage, or similar transducer is facilitated by adjustable holder. Developed for installation on Space Shuttle, it includes springs for maintaining uniform load on transducer with adjustable threaded cap for precisely controlling position of sensor with respect to surrounding structure.

B79-10536

AN EVALUATION OF LOW-COST PAYLOAD CARRIER

V. H. YOST

Jun. 1980

M-FS-25129

Vol. 4, No. 4, p. 536

Payload carrier designed for space vehicles is essentially cargo carrier that supports, positions, and protects various equipment and materials used in conducting experiments in weightless space environment. Proposed carrier entitled Materials Experiment Assembly II (MEA-II) is considered superior to previously developed models in size, weight, and cost to user. Structure is lightweight with insulated exterior and can be custom sized to meet user needs.

B79-10537

DETERMINING RADII OF CYLINDRICAL SEGMENTS

R. J. BUZZARD

Jun. 1980

LEWIS-12826

Vol. 4, No. 4, p. 536

Simple method determines either inside or outside radius of cylindrical segment when full diametrical section of material is not accessible for caliper measurement or if size, condition, or maneuverability of cylinder is not amenable to use of template or comparator-type devices. Method employs standard micrometer or depth gage with ball-end rod and fixed-length baseplate. Method is more adaptable in variety of situations than are existing methods, and measurements can be obtained under conditions that may be difficult if not impossible using other methods.

B79-10538

OVERALL LOUDNESS OF STEADY SOUNDS

W. L. HOWES and V. R. CANRIGHT (U.S. Army Research & Technology Labs.)

Jun. 1980 See also NASA-RP-1001(N79-25753)

LEWIS-12914

Vol. 4, No. 4, p. 537

Loudness (in sones) and loudness level (in phons) of any sound that is steady for tenths of second can be calculated using computer program derived from new operational theory of loudness. Theory is constructed from psychoacoustic and physiological data on mammalian (monkey) auditory systems. Computer program permits prediction of loudness of any steady sound including, for example, transportation noises, machinery noises, and other environmental noises, with possible additional applications to broadcasting, sound reproduction, establishment and enforcement of noise laws.

B79-10539

NONLINEAR STRUCTURAL ANALYSIS

W. E. HAISLER (Texas A&M Research Foundation)

Jun. 1980

M-FS-25122

Vol. 4, No. 4, p. 537

Development of computer programs for nonlinear structural analyses has progressed from special application programs to large, generalized programs. AGGIE I program is moderately-sized finite-element program that was developed specifically for nonlinear structural analysis. It is based on two- and three-dimensional isoparametric solid elements. AGGIE I accounts for nonlinearities due to large displacements, large strains and nonlinear material behavior.

B79-10540

REDUNDANT STRUCTURES AT ELEVATED TEMPERATURES

L. I. GUIDRY (Rockwell International Corp.) and G. H. MINTZ (Rockwell International Corp.)

Jun. 1980

MSC-18476

Vol. 4, No. 4, p. 538

In many structural systems, it is desirable to perform analysis to determine how safe structure is when subjected to 'yielding'

loads. FRAME 1 computer program analyzes, in both plastic and elastic ranges, redundant structures subjected to thermal and mechanical loads.

B79-10541

AERODYNAMIC PERFORMANCE OF JET-FLAP WINGS

G. R. HOUGH (Vought Corp.)

Jun. 1980

ARC-11215

Vol. 4, No. 4, p. 538

Computer program analyzes performance of jet-flap wings. Fast and easy-to-use prediction technique, it generates accurate solutions for wide range of wing geometries and trailing-edge jet momentum distributions. Analysis is based on optimized vortex-lattice approach and results in rapid convergence of both overall and distributed loadings.

B79-10542

TRANSONIC FLOW PAST SWEEPED WINGS

D. A. CAUGHEY (Cornell Univ.) and A. JAMESON (New York Univ.)

Jun. 1980

LANGLEY-12446

Vol. 4, No. 4, p. 539

FLO-22 computer program aids in numerical analysis of transonic potential flow past lifting, swept wing. FLO-22 uses relaxation method to solve finite-difference approximation of full-potential equation for transonic flow past configuration consisting of wing or arbitrary planform and dihedral extending from symmetry plane or wall. Comparisons of FLO-22 calculated results with experimental data for both conventional and super-critical transport wings show good agreement.

B79-10543

TRANSONIC AIRFOIL ANALYSIS AND DESIGN

L. A. CARLSON (Texas A. & M. Univ.)

Jun. 1980

LANGLEY-12354

Vol. 4, No. 4, p. 540

TRANDES program provides aircraft engineer with accurate and efficient tool for analysis of steady, irrotational, transonic flow over specified two dimensional airfoil in free air. Program is used to design airfoils having prescribed pressure distribution, including effects of weak viscous interaction. TRANDES yield accurate solutions efficiently for biconvex, conventional, and aftcambered airfoils.

B79-10544

HELICOPTER SLING LOADS

J. D. SHAUGHNESSY, K. R. YENNI, and T. N. DEAUX (Sperry Rand Corp.)

Jun. 1980

LANGLEY-12557

Vol. 4, No. 4, p. 540

Computer program compares various control-system concepts for improving handling qualities of single-rotor helicopters carrying relatively-large external sling loads. Computer program developed to test these and other ideas helps to circumvent expensive prototype and field testing. Comparisons between (1) computed data and flight data, (2) simulation-system values and flight test data, and (3) pilot evaluations of simulation and actual-flight conditions are very favorable.

B79-10545

WING AND LEADING-EDGE THRUST

H. W. CARLSON and R. J. MACK

Jun. 1980

LANGLEY-12516

Vol. 4, No. 4, p. 541

Computer program predicts leading-edge thrust for wings of arbitrary planform at supersonic speeds. Methods used in program are based on linearized wing theory. Program first calculates lifting pressures, lift coefficients, drag coefficients, moment coefficients, and lift distributions by using aft-element sensing technique. Next, empirical function calculates set of adjusted pressure-coefficient locations along leading edge. This information is then used to determine limiting value of singularity parameter and value of local leading-edge thrust coefficient.

B79-10546

SPACECRAFT TRAJECTORY

07 MACHINERY

J. L. HORSEWOOD (Business & Technological Systems, Inc.) and F. J. MANN (Business & Technological Systems, Inc.)
Jun. 1980

LEWIS-13248 Vol. 4, No. 4, p. 541
Two programs, Hiltop I and Hiltop II, generate optimum trajectory data for electric propulsion missions of interest in exploration of solar system. Propulsion-system logic is activated by single program-input key; program modifications retain Hiltop I within framework of logic, so that Hiltop I input files, will run Hiltop II version and produce identical results as before.

07 MACHINERY

B79-10118
ENSURING FLAT CUTS IN LONGWALL MINING
R. A. CAMPBELL, J. R. CURRIE, E. T. DEATON, and R. R. KISSEL
Aug. 1979

M-FS-23726 Vol. 4, No. 1, p. 117
Minicomputer-controlled towed vehicle automatically determines flatness of wall of coal or other mineral as it is being cut by mining machine and allows machine operator to correct cut as necessary. Vehicle is used for longwall mining.

B79-10119
FILM-ADVANCE MONITOR
F. R. DREISBACK, E. T. FREEMAN, and C. W. STUMP
Aug. 1979

LANGLEY-12474 Vol. 4, No. 1, p. 118
Device checks film advancement in remote cameras by adding optoelectronic sensor and idler sprocket with beam-breaker disk. Monitor is helpful to operators of cameras placed in hostile environments.

B79-10120
PLUG AND DRILL TEMPLATE
S. ORELLA (Grumman Aerospace Co.)
Aug. 1979

MSC-16748 Vol. 4, No. 1, p. 119
Device installs plugs and then drills them after sandwich face sheets are in place. Template guides drill bit into center of each concealed plug thereby saving considerable time and fastening weight reduction with usage of smaller plugs.

B79-10121
ANTENNA DEPLOYMENT MECHANISM
C. R. GRIFFIN and W. A. LEAVY
Aug. 1979

GSFC-12331 Vol. 4, No. 1, p. 120
All-mechanical antenna deployment system operates by single cable tensioned by electrically driven drum. Device is comprised of set of pulleys fixed to telescoping antenna mast, ratchet which prevents premature antenna retraction, and special latch which holds antenna in retracted position.

B79-10122
REMOTE MANIPULATOR FOR IC WAFERS
J. L. HUGGINS
Aug. 1979

M-FS-23846 Vol. 4, No. 1, p. 121
Mechanical manipulator automatically loads, transports, and unloads silicon wafers between processing stations in large-scale integrated-circuit fabrication facility at Marshall Space Flight Center thus eliminating need for human operators at various stages in processing cycle. It also reduces possibility of wafer contamination.

B79-10123
VOLUME-CHANGE INDICATOR FOR MOLDING PLASTIC
W. C. HELER

Aug. 1979
LANGLEY-12280 Vol. 4, No. 1, p. 122
Monitor consisting of two concentric disks measures change in volume of charge during compression/displacement molding. Device enables operator to decide whether process pressure and temperature are set properly or whether sufficient material has been placed in mold.

B79-10124
REMOVABLE FASTENER FOR INSULATING TILES
J. N. BROWN (Rockwell International Corp.), D. H. CADE (Rockwell International Corp.), and H. A. LOGSTON (Rockwell International Corp.)
Aug. 1979

MSC-16483 Vol. 4, No. 1, p. 123
Fastening device that consists of internally threaded silica insert, silica plug, and molded rubber retainer, seals holes in ceramic tiles securely over wide temperature excursions without cracking from thermal stresses. Device proves useful in high-temperature industrial applications.

B79-10125
RUBBER VALVE SEAL WITH TOUGH SKIN
J. W. MARTIN (TRW, Inc.)
Aug. 1979

LANGLEY-11776 Vol. 4, No. 1, p. 124
Curing technique for producing variable viscosity seal has hard sealing surface supported by softer rubber. Valve seal is clamped between two jaws for curing with hotter jaw at temperature of approximately 350 F and lower at room temperature. Result is durable tight valve-seat.

B79-10126
PARACHUTE DEPLOY/RELEASE MECHANISM
D. B. ROBELEN
Aug. 1979

LANGLEY-11576 Vol. 4, No. 1, p. 125
Mechanism operated by signals from single radio-control channel deploy and releases small drogue parachute from flying aircraft. Technique has uses in industrial process control and in recreational hobby applications.

B79-10127
REMOVABLE FASTENER FOR LARGE STRUCTURES
M. D. THULSON (Martin Marietta Corp.)
Aug. 1979

M-FS-23990 Vol. 4, No. 1, p. 126
Frame clamps lateral braces for assembling trusses, scaffolds, and other structures. Although approach originally proposed for assembling antennas and solar arrays in space, method is useful in temporary structures which require fastening before they are permanently welded or bonded.

B79-10128
QUARTZ BALL VALVE
C. GOETZ (Motorola, Inc.) and W. M. INGLE (Motorola, Inc.)
Aug. 1979

NPO-14473 Vol. 4, No. 1, p. 127
Quartz ball valve consisting of two quartz joints sealed back-to-back and seated in quartz sockets perform at temperatures of up to 1,250 C and in corrosive chemical environments without contamination or degradation.

B79-10129
METALLIC VIBRATION ISOLATORS
S. BENADO (Sundstrand Corp.) and K. J. HOTZ, JR. (Sundstrand Corp.)
Aug. 1979

M-FS-23949 Vol. 4, No. 1, p. 127
Woven metallic replacements for rubber isolators withstand heat, vacuum, and thermal shock. Isolators find uses where rubber deteriorates or its mechanical properties are inadequate. Potential applications are in power generators, vehicles, machinery, and portable tools.

B79-10130

CONTROLLER FOR A STRING ENGINE

A. R. MCDOUGAL

Aug. 1979

NPO-14388

Vol. 4, No. 1, p. 128

Hydraulic mechanism enables operator to adjust power and rotational direction of output of Stirling engine by applying only small force to control lever. Stirling engine has expander and displacer sections.

B79-10131

PRECISION LEVELING OF LARGE MACHINERY

H. P. PHILLIPS

Aug. 1979

NPO-13257

Vol. 4, No. 1, p. 130

Tool originally developed to level massive circular runners on antennas for communicating with space vehicles is modified to accurately align and level other large machines thus proves faster and more accurate than surveying technique.

B79-10132

STIFFNESS AND DAMPING OF ELASTOMERIC O-RINGS

N. S. DARLOW (Mechanical Technology, Inc.), R. K. MEHTA (Mechanical Technology, Inc.), and J. SMALLEY (Mechanical Technology, Inc.)

Aug. 1979 See also NASA-CR-135328 (N78-18460)

LEWIS-13079

Vol. 4, No. 1, p. 131

Report presents parameter preturbation test program (using nineteen combinations of Test parameters) for elastomeric O-rings conducting for range of materials, temperatures, amplitudes, squeeze valves, stretch valves, cross-sectional diameters, and groove widths. Tests data were plotted and Power law lines fitted to sets of data.

B79-10133

ANNULAR ACOUSTIC LINERS FOR TURBOFAN ENGINES

G. L. MINNER and E. J. RICE

Aug. 1979

LEWIS-12810

Vol. 4, No. 1, p. 132

Computer Program (written in FORTRAN IV) for design annular acoustic liners for turbofan engines first estimates noise generated by turbofan engine, then permits methodical examination of alternative choices of noise reduction.

B79-10258

EXTRA-SAFE TRACTOR-TRAILER COUPLING

W. P. ALBRECHT and R. H. SPARKS

Dec. 1979

FRC-10081

Vol. 4, No. 2, p. 271

Built-in safety mechanism for tractor-trailer 'fifth-wheel' coupling keeps rig together in case kingpin failure. Modified coupling utilizes all standard components, such as two wear plates, kingpin, and kingpin latch. It is modified by adding semicircular lip to top wear plate, matching semicircular slot to bottom wear plate, and two latching stop mechanisms.

B79-10259

LASH-FREE SPHERICAL BEARING

L. A. HEIN and W. N. MYERS

Dec. 1979

M-FS-23447

Vol. 4, No. 2, p. 272

Grooved and chamfered spherical bearing can maintain close contact between its ball and race, even when it is vibrated. Bearing thus eliminates major cause of wear and loosening in spherical bearings: pounding of ball on race under vibration.

B79-10260

CRYOGENIC-CONTAINER SUSPENSION STRAP

J. W. VORREITER

Dec. 1979

ARC-11157

Vol. 4, No. 2, p. 273

Fiberglass/epoxy supporting strap holds inner shell of cryogenic storage tank away from outer shell. Strap, made of two or more links, reduces heat leakage into cryogenic fluid more efficiently than conventional suspension systems.

B79-10261

COMPOSITE BEARING LINERS HAVE SERVICE TEMPERATURE OF 600 F

H. E. SLINEY

Dec. 1979 See also NASA-TM-78935 (N78-26445)

LEWIS-13277

Vol. 4, No. 2, p. 274

Self-lubricating graphite-fiber-reinforced polyimide liners for plain bearings raise service temperature from 325 F to 608 F.

B79-10262

ALL-METAL MUFFLER FOR DUCTS

P. T. SODERMAN (U. S. Army) and T. D. SCHARTON (Bolt, Beranek & Newman, Inc.)

Dec. 1979

ARC-11159

Vol. 4, No. 2, p. 275

Steel- or aluminum-skinned baffles absorb sound from air flowing over them. Because there is no bulk filler, muffler does not collect contaminants. If dirt accumulates on skin, it can be washed away without damaging muffler.

B79-10263

MULTIPURPOSE SEALS FOR PRESSURE VESSELS

A. E. BUGGELE

Dec. 1979 See also NASA-TM-X-73680 (N77-28493)

LEWIS-12944

Vol. 4, No. 2, p. 276

Cryogenic or multipurpose seals made by using new materials. Seal possesses sufficient flexibility to contain high-pressure fluids regardless of dimensional changes from higher pressure and/or temperature effects. Seal system operates in dual mode. Increased pressure supplements total sealing effort of seal system, which self-compensates for thermal contraction.

B79-10264

RETAINERS FOR THREADED PARTS

N. M. DAVIS (Bertea Corp.) and J. L. MANN (Bertea Corp.)

Dec. 1979

MSC-16198

Vol. 4, No. 2, p. 278

Retaining ring and fine wire secure nuts or screws reliably. Retainer is easy to assemble and to disassemble, even in confined areas.

B79-10265

SIMPLE NOISE SUPPRESSOR FOR VENTED HIGH-PRESSURE GAS

R. G. HUFF

Dec. 1979

LEWIS-13231

Vol. 4, No. 2, p. 278

Technique significantly reduces noise level. It uses principle of overexpansion of supersonic jet to create a multiple, strong shock-wave system in pipe, thereby decreasing exit velocity of jet and associated jet-mixing noise.

B79-10266

BIFUNCTIONAL GAS-FLOW REGULATOR

E. F. KOCH (Caltech)

Dec. 1979

NPO-13135

Vol. 4, No. 2, p. 279

Simple modification converts conventional high-pressure regulator to combination pressure-regulator/shutoff valve. Modification entails adding second diaphragm and pressure compartment. Modified valve is switched between its two functions by external two-position low-pressure valve.

B79-10267

EXTENDABLE MAST

J. V. COYNER, JR. (Astro Research Corp.) and J. M. HEDGEPEETH (Astro Research Corp.)

Dec. 1979

LANGLEY-12078

Vol. 4, No. 2, p. 280

Extendable mast is constructed from mutually supporting members that unfold as mast is deployed from compact package. Extendable mast is sturdy and can be compared to conventional rigid structures.

B79-10268

LOW-COST BORING MILL

07 MACHINERY

R. A. HIBDON (Boeing Services International, Inc.)

Dec. 1979

KSC-11112

Vol. 4, No. 2, p. 281

Portable unit and special fixture serve as boring mill. Machine, fabricated primarily from scrap metal, was designed and set up in about 12 working days. It has reduced setup and boring time by 66 percent as compared with existing boring mills, thereby making latter available for other jobs. Unit can be operated by one man.

B79-10269

BOND GRAPH FOR MODELING VALVES AND SWITCHES

V. D. GEBBEN

Dec. 1979

LEWIS-13177

Vol. 4, No. 2, p. 282

Digital graph element represents two-state devices. It can be used in modeling mechanical stops, backlash, and other discontinuities that occur whenever subsystems are connected or disconnected.

B79-10270

EXTRA-STRONG 'FLOATING NUT'

J. F. CHARLES (Rockwell International Corp.) and H. THEAKSTON (Standard Press Steel)

Dec. 1979

MSC-16938

Vol. 4, No. 2, p. 283

Increased bearing area withstands much higher torque than previous designs. Floating nut makes it possible to fasten parts on heavy-duty equipment, such as tractors and cranes, even though they can be reached for tightening from one side only.

B79-10271

FOLDABLE BEAM

R. F. CRAWFORD (Astro Research Corp.)

Dec. 1979 See also B77-10424

LANGLEY-12076

Vol. 4, No. 2, p. 284

Articulated beam folds into helix around cylindrical hub without segments becoming twisted. Twisting motion that normally occurs when a structure is folded into helix is undesirable in segmented beam because it complicates joints between segments.

B79-10272

ROTATING-SHAFT SEALS

Innovator not given (Space Propulsion & Power Division of Lewis Research Center) Dec. 1979 See also NASA-SP-8121 (N78-30584)

LEWIS-13227

Vol. 4, No. 2, p. 285

Monograph organizes and presents significant experience and knowledge accumulated by NASA in development and operational programs. Purpose is to assist designers. It reviews and assesses current design practices and from them establishes guidance for achieving greater consistency in design, increased reliability in end product, and greater efficiency in design effort.

B79-10273

AXIAL-FLOW TURBOPUMPS

Innovator not given (Space Propulsion & Power Division of Lewis Research Center) Dec. 1979 See also NASA-SP-8125 (N78-31164)

LEWIS-13228

Vol. 4, No. 2, p. 286

Monograph organizes and presents significant experience and knowledge accumulated by NASA in development and operational programs. It assists system designers. It reviews and assesses current design practices and from them establishes guidance for achieving greater consistency in design, increased reliability in end product, and greater efficiency in design effort.

B79-10400

AUTOMATIC THERMAL SWITCH

J. W. CUNNINGHAM and L. D. WING

Apr. 1980

GSFC-12415

Vol. 4, No. 3, p. 417

Automatic thermal switch closes and opens heat-flow path in response to temperature changes. Control is used to regulate

temperature in electronic circuitry or cryogenic refrigeration equipment.

B79-10401

COMPACT ROTARY SEQUENCER

W. T. APPLEBERRY (Rockwell International Corp.)

Apr. 1980

MSC-19514

Vol. 4, No. 3, p. 418

Rotary sequencer is assembled from conventional planetary differential gearset and latching mechanism utilizing inputs and outputs which are coaxial. Applications include automated production-line equipment in home appliances and in vehicles.

B79-10402

SEALED-IN-QUARTZ RESISTANCE HEATER

C. G. MILLER (Caltech) and J. B. STEPHENS (Caltech)

Apr. 1980

NPO-14529

Vol. 4, No. 3, p. 419

Electric resistance quartz heater operates at 1,400 F without developing excessively hot spots that can fail prematurely. Since resistance element is sealed in quartz, heater can be used in hostile environments. Sealed construction also keeps heater from contaminating heated object.

B79-10403

REMOTELY CONTROLLED LATCH

C. J. BARNETT (Rockwell International Corp.), P. CASTIGLIONE (Rockwell International Corp.), and L. R. CODA (Rockwell International Corp.)

Apr. 1980

MSC-18365

Vol. 4, No. 3, p. 420

Mechanism engages and disengages parallel plates carrying couplings and connectors. Designed to lock items in place for handling, storage, or processing under remote control, mechanism has fail-safe feature which does not allow plates to separate completely unless both are supported.

B79-10404

TORQUE-WRENCH EXTENDER FOR HARD-TO-REACH FASTENERS

S. SELIK (Rockwell International Corp.) and J. A. STEIN (Rockwell International Corp.)

Apr. 1980

MSC-18488

Vol. 4, No. 3, p. 421

Extension kit for torque wrench tightens and loosens captive fasteners in hard-to-reach places. Kit consists of four universal socket joints and extender rod enclosed in greased-packed tube. Extension kit replaces snap-on adapter and flexible drive shaft.

B79-10405

SLIP SENSOR

A. K. BEJCZY (Caltech)

Apr. 1980

NPO-14655

Vol. 4, No. 3, p. 422

Slippage of one surface, relative to another is detected by 'ball bearing' magnetic sensor. Omnidirectional sensor responds to slippage in any direction. Sensor is mounted in 'finger' of mechanical claw manipulator and signals operator who tightens grip by remote control when object slips.

B79-10406

COUPLER FOR REMOTE MANIPULATORS

A. A. RUDMANN

Apr. 1980

GSFC-12429

Vol. 4, No. 3, p. 423

Reliable, low-cost coupler aligns and grasps moving and rotating objects. Coupling mechanism may be used in handling of radio-active materials or in underwater explorations and other remote manipulators.

B79-10407

CENTRIFUGAL RECIPROCATING COMPRESSOR

W. H. HIGH (Caltech)

Apr. 1980

NPO-14597

Vol. 4, No. 3, p. 424

Efficient compressor uses centrifugal force to compress gas.

System incorporates two coupled dc motors, each driving separate centrifugal reciprocating-compressor assembly. Motors are synchronized to accelerate and decelerate alternately.

B79-10408
ANGULAR-DISPLACEMENT MECHANISM

J. A. CALVERT
Apr. 1980

MSC-15994 Vol. 4, No. 3, p. 424
Redundant-motor drive system, utilizing two electric motors, generates angular displacement to rotate mechanical or optical components in limited arc. Either motor can drive system while other remains stationary. Since stationary motor is not back-driven, system energy requirement is effectively reduced.

B79-10409
LONG-WEARING TFE/METAL BEARINGS

R. A. BRASS (Rockwell Intern. Corp.) and W. A. GILLON, JR. (Rockwell Intern. Corp.)
Apr. 1980

MSC-15994 Vol. 4, No. 3, p. 425
Method for making metal/polytetrafluoroethylene (TFE) bearing surfaces embeds long-wearing layer of TFE in microscopic pits in metal. Technique has potential applications in automotive gears, ball joints, and roller chain components. Other applications are in use of unlubricated bearings in chemical, pharmaceutical, and food-processing equipment.

B79-10410
POSITIVE ISOLATION DISCONNECT

M. V. FRIEDEL (Martin Marietta Corp.)
Apr. 1980 See also NASA-CR-144634 (N76-14187)

MSC-16043 Vol. 4, No. 3, p. 426
Positive-isolation-disconnect (PID) device with two mating halves prevents leakage or spillover when two fluid lines are disconnected. Each half has shutoff poppet to stop fluid flow. When flow is shut, poppets are flush against each other, leaving no space for fluid to remain in.

B79-10411
HEATED TOOL FOR AUTOCLAVES

T. T. SERAFINI, R. D. VANUCCI, P. J. CAVANO (TRW, Inc.), and W. E. WINTERS (TRW, Inc.)
Apr. 1980 See also NASA-CR-135377 (N78-25132)

LEWIS-12987 Vol. 4, No. 3, p. 427
Components made of composite materials are heated in autoclaves by employing electrical resistance heating blankets, thus avoiding need to heat entire autoclave volume. Method provides not only significant energy savings compared to heating entire pressure vessel but offers time savings in accelerated heat-up and cool-down cycles.

B79-10412
IMPROVED PISTON RINGS FOR A STIRLING ENGINE

A. R. MCDUGAL (Caltech)
Apr. 1980

NPO-14497 Vol. 4, No. 3, p. 428
Cast-iron piston rings coated with commercially-available antifriction materials improves cylinder life of high-performance Stirling engine. Ring is efficient heat conductor between piston and cylinder. Device has low thermal expansion which maintains minimum gap in ring, good radial force characteristics, and essentially indefinite life.

B79-10413
THERMAL SEAL FOR HIGH AND LOW TEMPERATURES

J. E. COLLIPRIEST, JR. (Rockwell Intern. Corp.) and D. M. FELL (Rockwell Intern. Corp.)
Apr. 1980

MSC-16151 Vol. 4, No. 3, p. 429
Composite seal remains flexible between -423 and +500 F. Due to wide temperature capability seal outperforms conventional elastomeric seals used in industrial freezers, environmental chambers, refrigerated trucks and railcars, and aircraft doors.

B79-10414
FLEXIBLE HEAT-AND-PRESSURE SEAL

J. BELLAVIA, JR. (Rockwell International Corp.) and J. O. KANE (Rockwell International Corp.)
Apr. 1980

MSC-18134 Vol. 4, No. 3, p. 430
Device withstands both heat and pressure and accommodates relative motion between sealed surfaces. Seal consists of flexible tube filled with thermally insulating material and coated with pressure resistant materials.

B79-10415
INSULATING SEAL FOR CRYOGENIC-LIQUID TRANSFER

I. M. KROENKE (Beech Aircraft Corp.)
Apr. 1980

MSC-11105 Vol. 4, No. 3, p. 431
Modification to male bayonet on cryogenic transfer line prevents freezeup of transfer-line coupling and leakage of cryogenic liquid. Procedure helps leakage in plumbing and other cold fluids.

B79-10416
CRYOGENIC SEAL FOR INSTRUMENT WIRES

H. V. MASSEY (Federal-Mogul Corp.)
Apr. 1980

MSC-18450 Vol. 4, No. 3, p. 431
Seal allows electrical wires to pass directly from sensors inside of liquid nitrogen storage vessel to outside instruments. No splices or connectors are required, so errors created by contact resistance are avoided. With method, measurements with highly sensitive instrumentation are made with greater accuracy.

B79-10417
STRONG, CORROSION-RESISTANT ALUMINUM TUBING

M. W. REED (Vought Corp.) and F. F. ADAMS (Vought Corp.)
Apr. 1980

MSC-18040 Vol. 4, No. 3, p. 432
When aluminum tubing having good corrosion resistance and postweld strength is needed, type 5083 alloy should be considered. Chemical composition is carefully controlled and can be drawn into thin-wall tubing with excellent mechanical properties. Uses of tubing are in aircraft, boats, docks, and process equipment.

B79-10418
DYNAMIC-PRESSURE REGULATOR

R. R. WALKER (Rockwell International Corp.)
Apr. 1980

MSC-18415 Vol. 4, No. 3, p. 433
Computerized pressure regulator controls gas pressure in fixed volume container, increasing, maintaining, and decreasing pressure according to programmed instructions. Controller is adaptable to any volume size or shape, and pressure variation may be synchronized.

B79-10419
BALANCED-FORCE FLOW-REGULATOR VALVE

W. C. HUBER
Apr. 1980

MSC-12731 Vol. 4, No. 3, p. 433
Valve regulates fluid pressure or flow by means of porous barrier and reduces surfaces exposed to liquid or gas flow that cause unbalanced pressure forces. Applications include hand valves, spool valves, and other devices that meter or control gases or liquids.

B79-10420
IMPROVED WRAP-CURTAIN SEAL

P. M. SCHROEDER (Rockwell International Corp.)
Apr. 1980

MSC-16647 Vol. 4, No. 3, p. 435
Wrapped-curtain thermal seal closes gaps around doors, windows, partitions, and other movable assemblies. Designed for simplicity, seal uses no springs or other mechanical devices and is easily installed on already existing structures.

B79-10421
ZERO-LEAK VALVE

07 MACHINERY

W. F. MACGLASHAN, JR. (Caltech)

Apr. 1980

NPO-14717

Vol. 4, No. 3, p. 435

Zero-leakage valve has fluid-sealing diaphragm support and flat sieve-like sealing surface. Diaphragm-support valve is easy to fabricate and requires minimum maintenance. Potential applications include isolation valve for waste systems and remote air-actuated valve. Device is also useful in controlling flow of liquid fluorine and corrosive fluids at high pressures.

B79-10422

SEPARATION REGION ON BOATTAIL NOZZLES

J. D. BUTEAU (United Technology Corp.), R. W. KING (United Technology Corp.), and W. M. PRESZ, JR. (United Technology Corp.)

Apr. 1980

LANGLEY-12453

Vol. 4, No. 3, p. 436

Computer subroutine package VISCUS offers flow analyst practical engineering computational procedure to model viscous effects of separated reverse flow on afterbody pressures and drag. Program is written in FORTRAN IV.

B79-10547

HIGH-ACCELERATION CABLE DEPLOYMENT

C. E. BARNES, T. N. CANNING, B. GIN, R. W. KING, and J. P. MURPHY

Jun. 1980

ARC-11256

Vol. 4, No. 4, p. 545

Prototype high-acceleration umbilical-cable deployment allows electrical communication between above-ground instrumentation and ballistic projectile below surface. Cable deployment is made up of forebody and afterbody. Forebody can be separated from afterbody by rocket, or they can be fired as unit at target that stops afterbody on impact (forebody would continue, deploying cable). Similar design could be used in study of sea ice and in other surface-penetration studies.

B79-10548

A SIMPLE SELF-SEALING PLUG

E. P. RUPPE (Rockwell International Corp.)

Jun. 1980

MSC-19635

Vol. 4, No. 4, p. 546

Inexpensive self-expanding plug makes convenient low-pressure seal. Simple elastomeric plug seals round ports and holes better than regular cork. Plug is inserted with plastic tool that squeezes it to diameter smaller than port opening. Once tool is removed, plug self-expands to its original shape, exerting stronger pressure to sealed surface than cork. Plug is less expensive to make than screw-on or cam-expanded seals.

B79-10549

MINIATURE MOTOR-DRIVEN INSTRUMENT VALVE

H. L. MINKIN

Jun. 1980

LEWIS-13195

Vol. 4, No. 4, p. 547

Valve consists of small geared reversible motor, operated by momentary contact closure, which drives shaft with O-rings placed to seal selected ports. Shaft rotates and also moves axially, causing ports to be alternately connected and disconnected. Electrical control of valve is provided by limit switches and relays. Design has advantage over other available valves: less precision machining of parts is required; machining operations are less expensive. Seals are made with O-rings, which are easily replaceable and inexpensive; valve uses less power. It can be used in any application requiring pilot valves for control devices.

B79-10550

FLEXIBLE SLIDING SEAL

E. L. WALLENHORST (Rockwell International Corp.)

Jun. 1980

MSC-18467

Vol. 4, No. 4, p. 548

Circular seal both slides and flexes to accommodate relative motion between two sealed members. Originally developed for Space Shuttle orbiter, it contains sliding seal to accommodate engine gimballing and flexible seal that absorbs forward motion at high thrust of engine heat shield relative to airframe. Other

possible applications are in support structures of heavy machinery and vehicle engines. Flexible sliding seal is ring about 7 feet in diameter and can withstand temperatures up to 1,600 F.

B79-10551

IMPROVED TABLE-SAW GUARD

B. R. DUNN (Rockwell International Corp.) and P. P. ZEBUS (Rockwell International Corp.)

Jun. 1980

MSC-19550

Vol. 4, No. 4, p. 549

Guard makes lighter contact on materials being sawed. Cuts are better controlled, and damages to fragile foam-type materials are reduced. Overhead support makes it possible to perform slot and step cuts, and thick materials are pushed under guard with less force. Guard is transparent plastic enclosure held by side-attached overhead support arm.

B79-10552

RECIRCULATING SPRAYER FOR FIBER-FILLED PAINTS

R. K. MAJOR (United Space Boosters, Inc.)

Jun. 1980

KSC-11146

Vol. 4, No. 4, p. 550

Recirculating paint sprayer applies spray of coarse filler in highly volatile solvent. Sprayer was developed for applying insulation material containing epoxy resin, glass fibers, and inert fillers suspended in chlorinated solvents. Sprayer resists abrasive action of fiberglass filler and chemical activity of solvent. Pump and position ensure more uniform pressure at spray gun without backpressure regulator, which tended to clog in old sprayer.

B79-10553

SCREW/STUD REMOVAL TOOL

K. DANIELS (Martin Marietta Corp.), D. E. HERRICK (Martin Marietta Corp.), and L. ROTHERMEL (Martin Marietta Corp.)

Jun. 1980

M-FS-22957

Vol. 4, No. 4, p. 550

Tool removes stubborn panheaded screws or studs where conventional tools would be either too weak or inconvenient to use. Screws with damaged heads or slots can also be removed this way. Tool can be worked with one hand and easily fits limited-access and blind areas. It can be made in various sizes to fit different screwheads.

B79-10554

A TOOL FOR INSTALLATION AND REMOVAL OF CYLINDRICAL BAFFLES

R. PESSIN (Rockwell International Corp.)

Jun. 1980

M-FS-19508

Vol. 4, No. 4, p. 551

Simple tool based on principle of automobile oil wrench slips over cylindrical thread-on baffle to install or remove it from baffle assembly. Tool consists of curled metal sheet brazed onto handgrip. Handgrip is adapted to be driven by wrench, ratchet, extension, torque wrench, or some other convenient tool. Clockwise twist of handgrip, tightens metal sheet around baffle to advance it into threaded joint. Counterclockwise twist loosens sheet for repositioning or tool removal.

B79-10555

SIMPLIFIED INSTALLATION OF THRUST BEARINGS

N. D. SENSENBAUGH (Rockwell International Corp.)

Jun. 1980

M-FS-19473

Vol. 4, No. 4, p. 552

Special handling sleeve, key to method of installing thrust bearings, was developed for assembling bearings on shaft of low-pressure oxygen turbo-pump. Method eliminates cooling and vacuum-drying steps which saves time, while also eliminating possibility of corrosion formation. Procedure saves energy because it requires no liquid nitrogen for cooling shaft and no natural gas or electric power for operating vacuum oven.

08 FABRICATION TECHNOLOGY

B79-10134**REPAIRING CRACKED GLASS**

D. D. HELMAN (Rockwell International Corp.), J. W. HOLT (Rockwell International Corp.) and L. V. SMISER (Rockwell International Corp.)

Aug. 1979

KSC-11097

Vol. 4, No. 1, p. 135

Filing procedure consisting of machined lightweight fused-silica tiles coated with thin-layer of borosilicate glass produces homogeneous seal in thin glass. Procedure is useful in repairing glass envelopes, X-ray tub windows, Dewar flasks, and similar thin glass objects.

B79-10135**FIXTURE FOR LIMITED-ACCESS WELDING**

J. R. TRYON (Rockwell International Corp.)

Aug. 1979

MSC-16698

Vol. 4, No. 1, p. 136

Fixture consisting of screw-on expansion clamps and backup bar aligns edges of plates for precision butt welding. Tool holds plates securely, without offset, and allows welding and clamp disassembly to be completed when there is access from only one side of structure.

B79-10136**GIANT-ELECTRODE WELDER**

B. R. ATKINS (Martin Marietta Corp.), R. A. CHIHOSKI (Martin Marietta Corp.), and F. YASHIRO (Martin Marietta Corp.)

Aug. 1979

LANGLEY-11429

Vol. 4, No. 1, p. 137

Welder produces spot-welds in place of rivets and saves time and money. Unit comprised of conical copper electrode base diameter of 11.5 ft is also capable of welding very thin, hard aluminum alloys.

B79-10137**FURNACE BRAZING UNDER PARTIAL VACUUM**

R. D. MCKOWN (Rockwell International Corp.)

Aug. 1979

M-FS-19363

Vol. 4, No. 1, p. 138

Brazing furnace utilizing partial-vacuum technique reduces tooling requirements and produces better bond. Benefit in that partial vacuum helps to dissociate metal oxides that inhibit metal flow and eliminates heavy tooling required to hold parts together during brazing.

B79-10138**ROOM-TEMPERATURE BONDING OF THIN PLASTIC SHEETS**

R. E. FRAZER

Aug. 1979

NPO-14346

Vol. 4, No. 1, p. 138

Thin sheets of plastic are bonded together, without heat, by depositing metal films on plastic and applying light pressure. Films are pressed together at room temperature, technique which makes it possible to join organic material without high temperatures necessary for conventional adhesive bonding.

B79-10139**TEMPORARY INSULATION WITH POLYURETHANE FOAM**

R. G. JACKSON (Rockwell International Corp.) and G. LERMA (Rockwell International Corp.)

Aug. 1979

MSC-18298

Vol. 4, No. 1, p. 139

Masking parts with Tetrafluoroethylene (TFE) tape allows easy removal of insulation; therefore, insulation can be used temporarily while testing of parts and then removed for their reworking.

B79-10140**ELECTROPLATING OFFERS EMBRITTLEMENT PROTECTION**

C. M. DANIELS, JR. (Rockwell Intern. Corp.)

Aug. 1970

M-FS-19330

Vol. 4, No. 1, p. 140

Thin copper electrodeposited layer protects metal parts in environments with which they may be incompatible. Originally developed for main engine of Space Shuttle where high strength nickel alloy bellows must operate in high-pressure hydrogen, technique protects nickel and is unaffected by forming process or subsequent heat treatment and preinstallation processing.

B79-10141**WINDOW WITH INTEGRAL SEAL**

J. M. BEHAR (Rockwell International Corp.)

Aug. 1979

MSC-16490

Vol. 4, No. 1, p. 140

Installation concept needed for air tight, water tight, laminated window does away with O-rings and sealants needed for effective edge seal. Pliable inner layer of laminating adhesive extends to form built-in gasket. Technique is usable for plastic or glass windows where space for gaskets and sealing rings is limited, canopies, and shields for military, marine, and land transportation vehicles.

B79-10142**FASTENING HARDWARE TO HONEYCOMB PANELS**

A. KENGER (Grumman Aerospace Co.)

Aug. 1979

MSC-16752

Vol. 4, No. 1, p. 141

Adhesive bonding reduces likelihood of skin failure due to excessive forces or torques by utilizing an adhesive to honeycomb skin. Concept is useful in other applications of composites such as aircraft, automobiles, and home appliances.

B79-10143**VAPOR-DEPOSITED GRADED-THICKNESS FILMS**

H. HERZIG and R. S. SPENCER

Aug. 1979

GSFC-11806

Vol. 4, No. 1, p. 142

Rotating substrate and slotted mask allow varying film thickness to be deposited from vapor by exposing film substrate to metal vapor through circular mask. Useful for fabricating variable thickness coatings for controlling thermal, electrical, or other properties.

B79-10144**APPLYING PHOTSENSITIVE EMULSIONS TO ENAMEL SURFACES**

W. FUHR (U. S. Radium Corp.)

Aug. 1979

MSC-18107

Vol. 4, No. 1, p. 143

Two layers of lacquer solve problem of adhesion to incompatible surface by spraying panels precoated with enamel paint with varying non-clear lacquers.

B79-10145**PLASTIC FILM INSULATES SOLAR CELLS FROM METAL SUBSTRATE**

T. C. DVORAK (TRW, Inc.)

Aug. 1979

M-FS-25007

Vol. 4, No. 1, p. 143

Approach uses polyimide film bonded to aluminum plate using epoxy-impregnated fiberglass cloth as insulating layer. Because film is nonporous, problems due to voids are eliminated.

B79-10146**CUTTING SILICON FOR SOLAR CELLS**

E. R. COLLINS

Aug. 1979

NPO-14406

Vol. 4, No. 1, p. 144

Multiple bandsaw blades are used to produce multiple cuts on several silicon boules simultaneously. Method is faster and more reliable than using single saw or multiple-cut reciprocating blades.

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B79-10147

FIXTURE FOR ASSEMBLING SOLAR PANELS

P. A. DILLARD (Lockheed Missiles and Space Co.) and W. M. FRITZ (Lockheed Missiles and Space Co.)
Aug. 1979

NPO-14303

Vol. 4, No. 1, p. 145

Vacuum fixture attaches array of silicon solar cells to mounting plate made of clear glass which holds and protects cells. Glass plate transmits, rather than absorbs, solar energy thus cooling cells for efficient operation. Device therefore reduces handling of cells and interconnecting conductors to one operation.

B79-10148

CMOS CIRCUIT-FABRICATION HANDBOOK

D. L. BOULDIN, R. W. EASTES, W. R. FELTNER, B. R. HOLLIS, JR., and D. E. ROUTH

Aug. 1979 See also NASA-TM-78188 (N78-78648)

M-FS-25034

Vol. 4, No. 1, p. 146

Report describes complementary metal-oxide-semiconductor (CMOS) process used to fabricate integrated circuits at Marshall Space Flight Center. It also presents general discussions of circuit design, mask making packaging, and testing.

B79-10274

ROTATABLE FIXTURE FOR SPRAY COATING

V. KATVALA, E. PORTER, and M. SMITH

Dec. 1979

ARC-11110

Vol. 4, No. 2, p. 289

Fixture that rotates about two axes ensures uniform coating and minimizes handling of coated workpiece. Each side of tile is coated in sequence by moving turntables until surface is perpendicular to spray. Process is repeated until desired thickness has built up.

B79-10275

TOOL CUTS SELF-LOCKING JOINTS IN PLASTICS

D. F. GOURLEY, S. C. IRICK, and H. H. MARSHALL

Dec. 1979

LANGLEY-12427

Vol. 4, No. 2, p. 290

Three lathe tools form different joints in gasket material.

B79-10276

FASTENER FOR EASY INSTALLATION AND REMOVAL OF TILES

L. H. MALETZ (Rockwell International Corp.)

Dec. 1979

MSC-16892

Vol. 4, No. 2, p. 291

Mating strips, one with metal hooks and one with metal loops, allow convenient mounting and removal on many kinds of modules. Principle is adaptable to applications where shear-resistant, compliant, removable fastening is needed in hard-to-reach places, especially when attached part is lightly loaded or fragile.

B79-10277

DISTORTION-FREE FOAMED-PLASTIC PARTS

P. A. HOGENSEN (Rockwell International Corp.) and R. G. JACKSON (Rockwell International Corp.)

Dec. 1979

ARC-11233

Vol. 4, No. 2, p. 292

In process for molding foamed-plastic products, gases that are formed as byproducts of foaming reaction escape through perforated die. Thus, volatiles are not trapped in pockets that can deform and weaken the molded part.

B79-10278

VACUUM CASTING OF THICK POLYMERIC FILMS

E. F. CUDDIHY (Caltech) and J. MOACANIN (Caltech)

Dec. 1979

NPO-14534

Vol. 4, No. 2, p. 292

Bubble formation and layering, which often plague vacuum-evaporated films, are prevented by properly regulating process parameters. Vacuum casting may be applicable to forming thick films of other polymer/solvent solutions.

B79-10279

CLEANING CONTAMINATED SUPERALLOY POWDERS

A. E. ANGLIN

Dec. 1979

LEWIS-13041

Vol. 4, No. 2, p. 293

Cleaning process reduces level of contaminants in superalloy end product. Procedure has applications to variety of powder metallurgy contamination problems.

B79-10280

CONFINED EXPLOSIVE JOINING OF TUBES

L. J. BEMENT

Dec. 1979

LANGLEY-12248

Vol. 4, No. 2, p. 294

Technique uses explosive ribbon to join and seal tubes hermetically while totally confining explosive products, such as smoke, light, and sound. Only click is audible. Process yields joints of the same strengths as parent metal.

B79-10281

LOW-COST, HIGH-PERFORMANCE SEPARATOR FOR ALKALINE BATTERIES

L. HSU, W. H. PHILLIPS, and D. W. SHEIBLEY

Dec. 1979 See also NASA-TP-1407 (N79-21128)

LEWIS-12972

Vol. 4, No. 2, p. 295

Ion-transporting polymeric films are fabricated by cross-linking polyvinyl alcohols in situ. Major advantage of these strong, more chemically resistant films separators lies in ease of fabrication.

B79-10282

SPLICING SINGLE-MODE OPTICAL FIBERS

R. GOLDSTEIN (Caltech) and W. C. GOSS (Caltech)

Dec. 1979

NPO-14626

Vol. 4, No. 2, p. 296

Approach used to weld multimode fibers has been adapted for more exacting splicing of single-mode fibers. Precision cleaver with tungsten carbide knife edge cuts single-mode optical fibers for welding. Welding apparatus includes micromanipulator, microscopes, and vacuum chucks.

B79-10283

HIGH-ENERGY-DENSITY CYLINDRICAL CAPACITORS

R. D. PARKER (Hughes Aircraft Co.) and J. A. ZELIK (Hughes Aircraft Co.)

Dec. 1979 See also NASA-CR-135286 (N78-24458); B79-10284

LEWIS-12999

Vol. 4, No. 2, p. 297

Manufacturing technique produces high quality metalized-film cylindrical capacitors of energy density greater than 0.1 J/g uncased, using either 24-gage polyvinylidene fluoride or 14-gage polycarbonate film. Components are wound wrinkle-free on hollow PTFE cores, using winding machine that applies constant dynamically controlled tension to film during winding operation.

B79-10284

HIGH-ENERGY-DENSITY FLAT FLEXIBLE CAPACITORS

R. D. PARKER (Hughes Aircraft Co.) and J. A. ZELIK (Hughes Aircraft Co.)

Dec. 1979 See also NASA-CR-135286 (N78-24458); B79-10283

LEWIS-13000

Vol. 4, No. 2, p. 298

Manufacturing technique produces flat flexible capacitors of energy density greater than 0.1 J/g. Exposure of some of metalized surface of each layer provides sufficient film surface to ensure good electrical connection to each layer of capacitor.

B79-10285

REMOVING OVERCOATINGS FROM MICROCIRCUITS

J. G. BELCHER, JR., D. P. NICOLAS, and F. VILLELLA

Dec. 1979

M-FS-23851

Vol. 4, No. 2, p. 299

Silicone resin of elastomer overcoatings are removed more quickly from microcircuit chips with hot concentrated sulfuric acid. Process takes few minutes as compared to day or two, using commercial solvents based on toluene, xylene, and the like. Overcoatings are removed to expose circuit for failure analysis.

B79-10286**ECONOMICAL SOLDER CONNECTIONS TO THIN FILMS**

J. A. BASS and E. M. GADDY

Dec. 1979

GSFC-12404

Vol. 4, No. 2, p. 300

Soldering procedure, successfully tested for attaching leads to silicon solar cells, cover-glasses, is simple, inexpensive, and very effective in forming stable connection. Procedure uses solder of indium alloyed with either silver or tin.

B79-10287**LIFT-OFF PROCEDURE IMPROVES PATTERN DEFINITION**

H. J. HOVEL (IBM Corp.) and H. A. HUGGINS (IBM Corp.)

Dec. 1979

LANGLEY-12392

Vol. 4, No. 2, p. 301

Layer of TiO₂, economically deposited during integrated circuit fabrication, allows 'nonpattern' metal to be removed cleanly.

B79-10288**QUALITY CONTROL DURING IC PROCESSING**

Innovator not given (Integrated Circuit Engineering Corp.) Dec. 1979

M-FS-25112

Vol. 4, No. 2, p. 302

Manual gives detailed test procedures for controlling silicon-wafer processing in manufacture of integrated circuits. Included among 43 test procedures are: ionic, bacterial, and solids contamination of high-purity water needed for wafer processing; crystallographic reflection, purity, and orientation; substrate dimensions and finish; thickness of deposited epitaxial films; oxide quality; photoresist characteristics; pinholes in insulating layers; metallized adhesion; and quality of ohmic contact.

B79-10423**FIXTURE FOR WINDING TRANSFORMERS**

M. T. MCILYMAN (Caltech)

Apr. 1980

NPO-14146

Vol. 4, No. 3, p. 439

Bench-mounted fixture assists operator in winding toroid-shaped transformer cores. Toroid is rigidly held in place as wires are looped around. Arrangement frees both hands for rapid winding and untangling of wires that occurs when core is hand held.

B79-10424**FABRICATION OF A PILLOWED AIRBAG**

L. M. LAMBERT (Rockwell Intern. Corp.) and G. OKAMOTO (Rockwell Intern. Corp.)

Apr. 1980

MSC-18455

Vol. 4, No. 3, p. 439

Rubber airbag composed of many small air 'pillows' is used as cushion for equipment during shipment. Airbag can also be used to apply uniform pressure to plastics or composites during curing.

B79-10425**TECHNIQUE FOR MOUNTING PYROELECTRIC DETECTOR ARRAYS**

R. A. BRECKENRIDGE, A. L. FRIPP, and J. B. ROBERTSON

Apr. 1980

LANGLEY-12363

Vol. 4, No. 3, p. 440

Technique is developed at Langley Research Center for mounting pyroelectric detector arrays on silicon integrated circuits. Procedure incorporates normal silicon integrated-circuit technology to form quasi-free mounts for detector arrays. Advantages of technique include lower cost, better image registration, and improved reliability.

B79-10426**REPAIRING CERAMIC INSULATING TILES**

B. R. DUNN (Rockwell Intern. Corp.) and E. L. LAYMAN (Rockwell Intern. Corp.)

Apr. 1980

MSC-18368

Vol. 4, No. 3, p. 441

Fused-silica tiles containing large voids or gauges are repaired without adhesives by plug insertion method. Tiles are useful in

conduits for high-temperature gases, in furnaces, and in other applications involving heat insulation.

B79-10427**DIMPLING AIRCRAFT SKINS FOR COUNTERSUNK-HEAD RIVETS**

J. G. BARBOUR

Apr. 1980

LANGLEY-12240

Vol. 4, No. 3, p. 442

Inexpensive hand-operated tool is used to dimple airframe skins to receive countersunk-head rivets. Tool replaces bulky pneumatic equipment normally used for dimpling and is useful for one person operation, thereby saving time and manpower.

B79-10428**SAFE BENDING OF BORON/ALUMINUM SHEETS**

G. G. LISKAY (Rockwell Intern. Corp.) and S. Y. YOSHINO (Rockwell Intern. Corp.)

Apr. 1980

MSC-19525

Vol. 4, No. 3, p. 442

Low cost procedure utilizing aluminum backing sheets protects boron/aluminum sheet from cracking during bending. Process utilizes inexpensive universal-brake bending dies rather than special hydroforming dies.

B79-10429**HEAT-SHRINKABLE FILM IMPROVES ADHESIVE BONDS**

J. M. JOHNS (Vought Corp.) and M. W. REED (Vought Corp.)

Apr. 1980

MSC-18437

Vol. 4, No. 3, p. 443

Pressure is applied during adhesive bonding by wrapping parts in heat-shrinkable plastic film. Film eliminates need to vacuum bag or heat parts in expensive autoclave. With procedure, operators are trained quickly, and no special skills are required.

B79-10430**DESIGN RULES FOR CMOS/SOS CIRCUITS**

Innovator not given (Government Systems Division of RCA Corp.) Apr. 1980

M-FS-25132

Vol. 4, No. 3, p. 444

Report presents design rules for advanced-technology integrated circuits made by self-aligned silicon-gate complementary - metal - oxide - semiconductor/silicon-on-sapphire (CMOS/SOS)-process.

B79-10431**CMOS/SOS PROCESSING**

P. RAMONETTA (RCA Corp.)

Apr. 1980

M-FS-25176

Vol. 4, No. 3, p. 444

Report describes processes used in making complementary - metal - oxide - semiconductor/silicon-on-sapphire (CMOS/SOS) integrated circuits. Report lists processing steps ranging from initial preparation of sapphire wafers to final mapping of 'good' and 'bad' circuits on a wafer.

B79-10432**LOW-COST PRODUCTION OF SOLAR-CELL PANELS**

D. B. BICKLER (Caltech), B. D. GALLAGHER (Caltech), and L. E. SANCHEZ (Caltech)

Apr. 1980

NPO-14453

Vol. 4, No. 3, p. 444

Large-scale production model combines most modern manufacturing techniques to produce silicon-solar-cell panels of low costs by 1982. Model proposes facility capable of operating around the clock with annual production capacity of 20 W of solar cell panels.

B79-10433**RF-SPUTTERED AND ION-PLATED SOLID LUBRICANTS**

T. SPALVINS

Apr. 1980 See also NASA-TM-78841 (N78-20333)

LEWIS-13147

Vol. 4, No. 3, p. 445

Report reviews advances in tribological uses of RF-sputtered and ion-plated films of solid film lubricants (laminar solids, soft

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metals, organic polymers) and wear-resistant refractory compounds.

B79-10434

PHOTOMASK AND PATTERN PROGRAMS

R. K. KIRSCHMAN (Caltech)

Apr. 1980

NPO-14419

Vol. 4, No. 3, p. 446

Package of computer programs helps designers with layout and graphics of photomasks. Photomasks are specifically useful to applications involving fine reproducibility, repetition, and fabrication on planar surfaces of materials, items fabricated from photomasks include circuit boards, magnetic bubble devices and integrated optic circuits.

B79-10435

SOLAR ARRAY MANUFACTURING INDUSTRY SIMULATION

R. G. CHAMBERLAIN (Caltech), P. J. FIRNETT (Caltech), and B. KLEINE (Caltech)

Apr. 1980

NPO-14747

Vol. 4, No. 3, p. 446

Solar Array Manufacturing Industry Simulation (SAMIS) program is a standardized model of industry to manufacture silicon solar modules for use in electricity generation. Model is used to develop financial reports that detail requirements, including amounts and prices for materials, labor, facilities, and equipment required by companies.

B79-10556

STRESS-RELIEVED SOLDER JOINTS

C. J. ZEMENICK (Rockwell Intern. Corp.)

Jun. 1980

MSC-14981

Vol. 4, No. 4, p. 555

Mechanical stress on solder joints is reduced by procedure for soldering electronic components to circuit boards. Procedure was developed for radio-frequency (RF) strip-line circuits, for which dimensions must be carefully controlled to minimize parasitic capacitance and inductance. Procedure consists of loosening component from its mounting after each lead is soldered relieving induced stresses before next soldering step.

B79-10557

REPAIRING FLAT CABLES

Innovator not given (Aerospace Division of Honeywell, Inc.) Jun. 1980

LANGLEY-11950

Vol. 4, No. 4, p. 556

Simple procedure avoids costly repairs. Cable insulation flaps are cut and peeled back to expose conductor fractures. Insulation layers of decreasing size allow cable to flex without overstressing mended connectors.

B79-10558

SCRATCH ENCOURAGES SELECTIVE DOPING

F. Z. HAWRYLO (RCA Corp.) and H. KRESSEL (RCA Corp.)

Jun. 1980

LANGLEY-11590

Vol. 4, No. 4, p. 557

Dislocations induced by scratching produce deep narrow spikes of zinc diffused in gallium arsenide. Density of defects formed locally increases zinc diffusion coefficient. Enhancements by factor of 6 have been observed. Technique works for other dopants than zinc and for other semiconductors besides GaAs.

B79-10559

WIRE STRIPPER PROTECTS CABLE SHIELDING

M. A. ECONOMU

Jun. 1980

FRC-10111

Vol. 4, No. 4, p. 557

Four-blade stripper removes insulation from end or middle of wire without damaging shielding.

B79-10560

STITCH-BOND PARALLEL-GAP WELDING FOR IC CIRCUITS

P. CHVOSTAL (Odetics, Inc.), J. TUTTLE (Odetics, Inc.), and R. VANDERPOOL (Odetics, Inc.)

Jun. 1980

MSC-16459

Vol. 4, No. 4, p. 558

Stitch-bonded flatpacks are superior to soldered dual-in-lines where size, weight, and reliability are important. Results should interest designers of packaging for complex high-reliability electronics, such as that used in security systems, industrial process control, and vehicle electronics.

B79-10561

CRIMPED THERMOCOUPLE CONNECTIONS

K. L. BILLINGTON (Rockwell Intern. Corp.) and H. S. MAY (Rockwell Intern. Corp.)

Jun. 1980

MSC-18489

Vol. 4, No. 4, p. 559

When proper procedures are followed, hand crimping tool makes reliable, low-cost thermocouple connections. Procedure reduces time and expense of splicing solid and stranded platinum thermocouple wires.

B79-10562

MULTILAYER METALIZATION OF MOS IC'S

D. L. BOULDIN, W. R. FELTNER, B. R. HOLLIS, JR., and D. E. ROUTH

Jun. 1980

M-FS-23541

Vol. 4, No. 4, p. 560

Modified ion-bombardment technique interconnects MOS circuit elements without affecting circuit parameters. Multilevel metalization involves: surface treatment prior to metalization; first metalization; metal pattern definition and photoresist removal; dielectric deposition; second metalization; and final dielectric deposition.

B79-10563

IMPROVED PROCESS CONTROL FOR VMOS FET'S

M. D. JHABVALA

Jun. 1980

GSFC-12515

Vol. 4, No. 4, p. 561

Method is applied in middle of fabrication process: (a) after mask region is formed, diffused-boron region is etched; (b) etching is left incomplete for ion implantation; (c) boron ions are implanted into region to define accurately crucial geometry of V-groove; (d) groove is etched to completion, forming two well-defined diffusion regions that serve as source and drain of transistor. Remaining process is conventional.

B79-10564

SECURING CONNECTOR PINS TO A PC BOARD

D. GRAHAM (Sperry Rand Corp.), R. WILKES (Sperry Rand Corp.), and J. ZORNS (Sperry Rand Corp.)

Jun. 1980

MSC-16059

Vol. 4, No. 4, p. 561

Solder preforms hold pins firmly to withstand repeated insertion and removal of circuit cards. Advantage is excellent electrical continuity between board circuits and pins.

B79-10565

IMPROVED SWITCH-RESISTOR PACKAGING

R. E. REDMERSKI (Rockwell Intern. Corp.)

Jun. 1980

MSC-19531

Vol. 4, No. 4, p. 562

Packaging approach makes resistors more accessible and easily identified with specific switches. Failures are repaired more quickly because of improved accessibility. Typical board includes one resistor that acts as circuit breaker, and others are positioned so that their values can be easily measured when switch is operated. Approach saves weight by using less wire and saves valuable panel space.

B79-10566

PRECISION SCRIBER

R. J. BUZZARD

Jun. 1980

LEWIS-12976

Vol. 4, No. 4, p. 563

Device scribes fine lines to precise tolerances on flat or round surfaces. Scriber is used in conjunction with toolmaker's microscope and will scribe metal of nonmetallic surfaces. When

not in use, scribe is easily retracted or swung out of way so microscope can be used for other purposes.

B79-10567

IMPROVED ACOUSTIC LEVITATION APPARATUS

L. H. BERGE, J. L. JOHNSON, W. A. ORAN, and D. A. REISS
Jun. 1980

M-FS-25050

Vol. 4, No. 4, p. 564

Concave driver and reflector enhance and shape levitation forces in acoustic resonance system. Single-mode standing-wave pattern is focused by ring element situated between driver and reflector. Concave surfaces increase levitating forces up to factor of 6 as opposed to conventional flat surfaces, making it possible to suspend heavier objects.

B79-10568

A PLASMA-SPRAYED VALVE COATING

A. BRENNAN (Rockwell Intern. Corp.) and A. B. OLMORE
(Rockwell Intern. Corp.)

Jun. 1980

M-FS-19494

Vol. 4, No. 4, p. 565

Need to reduce wear on nickel alloy seats and poppets for Space Shuttle main engine led to fused cobalt/tungsten carbide coating. Coating, which is dense, wear-resistant, and nonporous, can be applied in controlled amounts to various substrate configurations. Ease of application to parts with intricate shapes and contours should make coating useful in automotive and aircraft manufacturing.

B79-10569

INHIBITING OXIDATION OF TUNGSTEN AT HIGH TEMPERATURES

J. LOMBARD (Rockwell Intern. Corp.) and M. MOYNAHAN
(Rockwell Intern. Corp.)

Jun. 1980

M-FS-19347

Vol. 4, No. 4, p. 565

Coating of mixed ceramics protects tungsten from oxidation. Originally suggested for critical tungsten components on Space Shuttle, mixture consists of 98.5 percent aluminum oxide and 1.5 percent silicon dioxide. It is particularly useful in welding when there is danger that welding arc can burn adjacent components. If coating is applied to nearby tungsten parts, it prevents arcing.

B79-10570

ELECTRODEPOSITION PROCESS REDUCES COST OF COLD PLATES

E. P. RUPPE (Rockwell Intern. Corp.)

Jun. 1980

MSC-19524

Vol. 4, No. 4, p. 566

Efficient nickel heat-exchanger cold plates can be fabricated less expensively than stainless steel plates. If adapted to mass production, it is estimated that nickel cold plates might be made for about 30 percent less than stainless-steel plates.

B79-10571

TUBE-SHAPE VERIFIER

A. N. ANDERSON (Rockwell Intern. Corp.) and C. R. CHRIST
(Rockwell Intern. Corp.)

Jun. 1980

MSC-19623

Vol. 4, No. 4, p. 567

Inexpensive apparatus checks accuracy of bent tubes. Assortment of slotted angles and clamps is bolted down to flat aluminum plate outlining shape of standard tube bent to desired configuration. Newly bent tubes are then checked against this outline. Because parts are bolted down, tubes can be checked very rapidly without disturbing outline. One verifier per tube-bending machine can really speed up production in tube-bending shop.

B79-10572

ADJUSTING AN ELECTRON BEAM FOR DRILLING

C. L. CHILDRESS (Rockwell Intern. Corp.)

Jun. 1980

M-FS-19326

Vol. 4, No. 4, p. 568

Reticle contains two concentric circles: inner circle insures

beam circularity and outer circle is guide to prevent beam from cutting workpiece clamp. Precise measurement of beam and clamp are required with old reticle. New reticle speeds up electron-beam drilling process by eliminating need to rotate eyepiece to make measurements against reticle scale.

B79-10573

REPAIRING SEALING SURFACES ON ALUMINUM CASTINGS

T. L. HANNA (Rockwell Intern. Corp.)

Jun. 1980

M-FS-19455

Vol. 4, No. 4, p. 568

Approach using stylus nickel plating instead of copper and cadmium plating has simplified repair procedure. Damaged sealing surfaces are stylus nickelplated in one step. Superficial scratches and porous areas are removed more easily from repaired surface by simply lapping sealing areas to required finish. Although method is aimed for aerospace components, it may be easily incorporated into conventional aluminum casting technology. One-step repair can be considered for cast-aluminum automobile and aircraft engines to reduce time and costs.

B79-10574

PROTECTING BRAZING FURNACES FROM AIR LEAKS

C. T. ARMENOFF (Rockwell Intern. Corp.) and R. D. MCKOWN
(Rockwell Intern. Corp.)

Jun. 1980

M-FS-19379

Vol. 4, No. 4, p. 569

Inexpensive inert-atmosphere shielding protects vacuum brazing-furnace components that are likely to spring leak. Pipefittings, gages, and valves are encased in transparent plastic shroud inflated with argon. If leak develops, harmless argon will enter vacuum chamber, making it possible to finish ongoing brazing or heat treatment before shutting down for repair.

B79-10575

AN IMPROVED WELDING-ARC STARTER

T. J. TAUFER (Rockwell Intern. Corp.)

Jun. 1980

MSC-17415

Vol. 4, No. 4, p. 570

Simple circuit modification makes pulse-arc starters more reliable at low currents. Once arc is started, it is maintained at lower voltage level than in previous arrangement due to sufficient concentration of metallic vapor between electrode and working surface as result of improved conduction.

B79-10576

MICROSCOPE FOR HIGH-TEMPERATURE WELDING

O. E. ACCOUNTIUS (Rockwell Intern. Corp.)

Jun. 1980

MSC-19572

Vol. 4, No. 4, p. 571

Dark glass in eyepieces lets welder look at fine parts without eye damage. Previously welder had to repair barely visible crack without magnification, because necessary goggles kept eyes too far from microscope eyepieces.

B79-10577

BRAZING TITANIUM TO STAINLESS STEEL

R. I. BATISTA (TRW, Inc.)

Jun. 1980

LANGLEY-11441

Vol. 4, No. 4, p. 571

Titanium and stainless-steel members are usually joined mechanically for lack of any other effective method. New approach using different brazing alloy and plating steel member with nickel resolves problem. Process must be carried out in inert atmosphere.

B79-10578

SWITCHBOX FOR WELDING TORCHES

R. K. BURLEY (Rockwell Intern. Corp.)

Jun. 1980

M-FS-19354

Vol. 4, No. 4, p. 572

Switchbox can be used to change from one welding torch setup to another without stopping production line. Simple flip of switch connects gas, water, and power to selected torch. In conventional systems, production must be stopped so that maintenance people can disconnect and reconnect another torch.

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B79-10579

THERMAL JACK

C. T. ARMENOFF (Rockwell Intern. Corp.) and R. D. MCKOWN (Rockwell Intern. Corp.)
Jun. 1980

M-FS-19365

Vol. 4, No. 4, p. 572

Auxiliary furnace tool forces part to match length of mating part during brazing. As brazed assembly cools, jack contracts faster and disengages from fitting studs.

B79-10580

VIEWING ELECTRON-BEAM WELDS IN PROGRESS

C. T. ARMENOFF (Rockwell Intern. Corp.)
Jun. 1980

M-FS-19364

Vol. 4, No. 4, p. 573

With aid of optical filter, operator of electron-beam welding machine can view TV image of joint that is being welded and can make corrections as necessary. Operator can see when weld bead gets out of alignment, for example, and compensate for deflection of electron beam caused by changes in magnetic field.

B79-10581

WELDING MULTIPLE PLIES WITH AN ELECTRON BEAM

F. J. KILUK (Rockwell Intern. Corp.)
Jun. 1980

M-FS-19428

Vol. 4, No. 4, p. 574

Method for electron-beam welding of multi-ply metal sheets eliminates ply separation and minimizes porosity. Method was developed for assembling bellows made of four plies of iron/nickel alloy sheets. Method consists of making successive stitch welds with electron beam until weld seam is completely filled in and all plies have been penetrated.

B79-10582

BONDING SOFT RUBBER OR PLASTICIZED ELASTOMERS TO METAL

J. M. CLEMONS, F. E. LEDBETTER, III, and W. T. WHITE
Jun. 1980

M-FS-25181

Vol. 4, No. 4, p. 574

Approach using bond-cover coat of unplasticized rubber between soft rubber and adhesive eliminates diffusion problem. Approach is useful in making improved seals in automobile engines, industrial and public plumbing, and in other areas using soft-rubber-to-metal bonds. Seals and gaskets made this way would not have to be replaced very often, reducing cost of maintenance.

B79-10583

VACUUM-AND-PRESSURE LAMINATING POLYMER MATERIALS

D. R. HOFFMAN and T. J. RILEY
Jun. 1980

LEWIS-12721

Vol. 4, No. 4, p. 575

Lamination setup is used to produce void-free bonds by first employing vacuum to outgas materials and adhesive at temperature below curing temperature and then subjecting assembly to pressure and temperature necessary to cure.

B79-10584

EVACUATED-DISPLACEMENT COMPRESSION MOLDING

W. C. HEIR

Jun. 1980

LANGLEY-12523

Vol. 4, No. 4, p. 576

Compression-molding process comprises: loading molding compound; evacuation; applying pressure to shape softened compound; further compressing while using compound as hydraulic fluid; and applying heat and pressure for cure. Major advantage of method is that it prevents increase in cavity volume (sporadic or general) throughout transformation phase of molding.

B79-10585

ELECTROMAGNETIC BONDING OF PLASTICS TO ALUMINUM

A. T. SHEPPARD (Martin Marietta Corp.) and L. SILBERT (Martin Marietta Corp.)
Jun. 1980

M-FS-25083

Vol. 4, No. 4, p. 577

Electromagnetic curing is used to bond strain gage to aluminum tensile bar. Electromagnetic energy heats only plastic/metal interface by means of skin effect, preventing degradation of heat-treated aluminum. Process can be easily applied to other metals joined by high-temperature-curing plastic adhesives.

B79-10586

STRUCTURALLY-CONTINUOUS COMPOSITE CORNERS

A. C. JACKSON (Lockheed Aircraft Corp.) and J. A. VANHAMERS-VELD (Lockheed Aircraft Corp.)

Jun. 1980

LANGLEY-11942

Vol. 4, No. 4, p. 578

Flat composite materials are cut at certain angles to form boxes with corners as thick as walls. Patterns produce uniform corners, and cuts are structured so that shear loads are transferred from ply to ply instead of across one surface.

B79-10587

REMOVING BONDED SKIN FROM A SUBSTRATE

E. N. CHARTIER (Rockwell Intern. Corp.)
Jun. 1980

MSC-19664

Vol. 4, No. 4, p. 579

Metal skin is peeled off like sardine-can cover with key. Method is useful in removing bonded skins from any substrate where substrate is strong enough not to buckle or tear when bonded skin is rolled free. Also, it is useful for removing sections of damaged skin where bladders of other equipment below substrate might be damaged if saw or router were used to cut completely through skin.

B79-10588

ARC-TERMINATION CRACKS IN INCONEL 718 AND INCOLOY 903

E. BAYLESS, J. MCCAIG, and R. POORMAN
Jun. 1980

M-FS-25089

Vol. 4, No. 4, p. 579

Four-phase study was launched to determine welding conditions conducive to crater cracks and to establish procedures for fixing them. Results of study are published in brief report.

B79-10589

COST SAVINGS IN LSI FABRICATION

R. P. HIMMEL (Hughes Aircraft Co.), S. SALMASSY (Hughes Aircraft Co.), and S. M. STUHLBARG (Hughes Aircraft Co.)
Jun. 1980

M-FS-25079

Vol. 4, No. 4, p. 580

One year study program was divided into three tasks: to identify costs factors involved in packaged electronic subsystems as function of LSI density and reliability; to select most promising factors that might be modified to reduce costs in high-density packaging; and to investigate cost-saving beam tape technology for producing high-volume discrete-device packages. Results are published in 67 page report.

09 MATHEMATICS AND INFORMATION SCIENCES

B79-10149

ESTIMATING THE COST OF PRODUCTION STOPPAGE

L. M. DELIONBACK

Aug. 1979 See also NASA-TM-78131 (N77-34044)

M-FS-23884

Vol. 4, No. 1, p. 149

Estimation model considers learning curve quantities, and time of break to forecast losses due to break in production schedule. Major parameters capable of predicting costs are number of units made prior to production sequence, length of production break, and slope of learning curve produced prior to break.

B79-10150**INEXPENSIVE LAND-USE MAPS EXTRACTED FROM SATELLITE DATA**

T. W. BARNEY (Missouri Univ.), D. J. BARR (Missouri Univ.), C. D. ELIFRITS (Missouri Univ.), and C. J. JOHANNSEN (Missouri Univ.)

Aug. 1979

M-FS-25111

Vol. 4, No. 1, p. 150

Satellite images are interpretable with minimal skill and equipment by employing method which uses false color composite print of image of area transmitted from Landsat satellite. Method is effective for those who have little experience with satellite imagery, little time, and little money available.

B79-10151**LANDSAT AND WATER POLLUTION**

P. CASTRUCCIO (Ecosystems Intern., Inc.), T. FOWLER (Ecosystems Intern., Inc.), and H. LOATS, JR. (Ecosystems Intern., Inc.)

Aug. 1979

M-FS-25099

Vol. 4, No. 1, p. 150

Report presents data derived from satellite images predicting pollution loads after rainfall. It explains method for converting LANDSAT images of eastern United States into cover maps for Baltimore/five county region.

B79-10152**ANALYZING EARTH'S SURFACE DATA**

D. J. BARR (Missouri Univ.) and C. D. ELIFRITS (Missouri Univ.)

Aug. 1979

M-FS-25051

Vol. 4, No. 1, p. 152

Manual discusses simple inexpensive image analysis technique used to interpret photographs and scanner of data of Earth's surface. Manual is designed for those who have no need for sophisticated computer-automated analysis procedures.

B79-10153**REDUNDANT SYSTEM RELIABILITY ANALYSIS**

C. J. MASRELIEZ (Boeing Co.)

Aug. 1979

LANGLEY-12069

Vol. 4, No. 1, p. 152

Computer Aided Redundant System Reliability Analysis (CARSARA) program facilitates reliability assessment of fault-tolerance reconfigurable systems. CARSARA accounts for influences from transient faults and is used to model wide range of redundancy management strategies.

B79-10289**PROGRAMMING TECHNIQUES FOR CDC EQUIPMENT**

J. R. NEWSOM (Vought Corp.) and S. H. TIFFANY (Vought Corp.)

Dec. 1979 See also NASA-CR-3033 (N78-28832)

LANGLEY-12486

Vol. 4, No. 2, p. 305

Five techniques reduce core requirements for fast batch turnaround time and interactive-terminal capability. Same techniques increase program versatility, decrease problem-configuration dependence, and facilitate interprogram communication.

B79-10290**COMPARING DATA TRANSMISSION SYSTEMS**

R. F. RICE (Caltech)

Dec. 1979

NPO-14642

Vol. 4, No. 2, p. 305

Scheme for coding and compressing data signals for transmission are compared by new analytical technique. Transmission rate of several schemes are plotted for direct comparison and evaluation.

B79-10291**ANNUITY-ESTIMATING PROGRAM**

D. W. JILLIE

Dec. 1979

ARC-11139

Vol. 4, No. 2, p. 307

Program computes benefits and other relevant factors for Federal Civil Service employees. Computed information includes retirement annuity, survivor annuity for each retirement annuity,

highest average annual consecutive 3-year salary, length of service including credit for unused sick leave, amount of deposit and redeposit plus interest.

B79-10292**MULTIPURPOSE INTERACTIVE NASA INFORMATION SYSTEM**

J. M. HILL (Computer Sciences Corp.), R. L. KEEFER (Computer Sciences Corp.), D. R. SANDERS (Computer Sciences Corp.), and R. N. SEITZ (Computer Sciences Corp.)

Dec. 1979

M-FS-23753

Vol. 4, No. 2, p. 307

Multipurpose Interactive NASA Information System (MINIS) is data management system capable of retrieving descriptive data from LANDSAT photos. General enough to be used with other user-defined data bases, interactive data management and information retrieval system was especially developed for small and medium-sized computers. It uses free-form data base that allows one to create entirely new and different data bases and to control format of output products.

B79-10293**MODEL FOR REFINING OPERATIONS**

D. N. DUNBAR (Gordian Associates, Inc.) and B. G. TUNNAH (Gordian Associates, Inc.)

Dec. 1979

LEWIS-13047

Vol. 4, No. 2, p. 308

Program predicts production volumes of petroleum refinery products, with particular emphasis on aircraft-turbine fuel blends and their key properties. It calculates capital and operating costs for refinery and its margin of profitability. Program also includes provisions for processing of synthetic crude oils from oil shale and coal liquefaction processes and contains highly-detailed blending computations for alternative jet-fuel blends of varying endpoint specifications.

B79-10436**REVISED ADAGE GRAPHICS COMPUTER SYSTEM**

J. S. TULPPO (Sperry Rand Corp.)

Apr. 1980

LANGLEY-12492

Vol. 4, No. 3, p. 449

Bootstrap loader and mode-control options for Adage Graphics Computer System significantly simplify operations procedures. Normal load and control functions are performed quickly and easily from control console. Operating characteristics of revised system include greatly increased speed, convenience, and reliability.

B79-10437**COMPILER VALIDATES UNITS AND DIMENSIONS**

F. E. LEVINE (IBM Corp.)

Apr. 1980

KSC-11054

Vol. 4, No. 3, p. 449

Software added to compiler for automated test system for Space Shuttle decreases computer run errors by providing offline validation of engineering units used system command programs. Validation procedures are general, though originally written for GOAL, a free-form language that accepts 'English-like' statements, and may be adapted to other programming languages.

B79-10438**A FLEXIBLE DATA BASE**

E. R. COLE (Caltech), S. N. HIGGINS (Caltech), and R. L. WATSON (Caltech)

Apr. 1980

NPO-13777

Vol. 4, No. 3, p. 450

Report describes hierarchical multilevel, multientry-point data file, and methodology of developing such file for unit-record-oriented system. Data base structure was prepared for Goldstone Energy Project where it is used in analyzing past energy consumption, predicting future consumption, and aiding design of buildings.

B79-10439**COMPUTING TIME- AND FREQUENCY-DOMAIN ANALYSIS**

J. D. BROWNLOW

09 MATHEMATICS AND INFORMATION SCIENCES

Apr. 1980

FRC-10121

Vol. 4, No. 3, p 451

Computer program Spectrum Analysis is developed to perform wide range statistical-estimation functions. It is rigorous tool for time- and frequency-domain studies. Program is written in FORTRAN IV.

B79-10440

LINEAR CONTINUOUS AND SAMPLED-DATA SYSTEMS

J. W. EDWARDS

Apr. 1980

FRC-10114

Vol. 4, No. 3, p 451

Program performs general analysis of linear and continuous, discrete and sampled-data systems using state-variable techniques. Program is especially suited analysis of linearized control system problems. It also can be used to model system described by combination of differential equations and Laplace transform blocks, such as aircraft control system.

B79-10441

MASS PROPERTIES OF A RIGID STRUCTURE

J. L. GILBERT, R. A. HULL, and P. J. KLICH

Apr. 1980

LANGLEY-12454

Vol. 4, No. 3, p 451

Program MASPROP rapidly calculates mass properties of complex, rigid structural systems. Its basic premise is that complex systems can be adequately described by combination of basic elementary structural shapes.

B79-10442

IMAGE-ANALYSIS LIBRARY

Innovator not given (College of Science of Texas A. & M. University) Apr. 1980

MSC-18178

Vol. 4, No. 3, p 452

MATHPAC image-analysis library is collection of general purpose mathematical and statistical routines and special-purpose data-analysis and pattern-recognition routines for image analysis. MATHPAC library consists of Linear Algebra, Optimization, Statistical-Summary, Densities and Distribution, Regression, and Statistical-Test packages.

B79-10443

MODERN PROGRAMMING LANGUAGE

G. H. FELDMAN (Caltech) and J. A. JOHNSON (Caltech)

Apr. 1980

NPO-14105

Vol. 4, No. 3, p 452

Structural-programming language is especially tailored for producing assembly language programs for MODCOMP II and IV mini-computers. Modern programming language consists of set of simple and powerful control structures that include sequencing alternative selection, looping, sub-module linking, comment insertion, statement continuation, and compilation termination capabilities.

B79-10590

OPTICAL COMPARATOR USES HOLOGRAPHIC SUBTRACTION

D. W. VAHEY (Battelle Memorial Inst.) and C. M. VERBER (Battelle Memorial Inst.)

Jun. 1980 See also NASA-CR-2829 (N77-28471)

LANGLEY-12126

Vol. 4, No. 4, p. 583

Integrated optical comparator compares reference and signal voltages by their effects on coherent light beam. If both voltages are same, beam is essentially unperturbed. If voltages differ, light is deflected by previously recorded hologram to detector.

B79-10591

NUMERICAL ANALYSIS OF COMPLEX FLUID-FLOW SYSTEMS

R. L. HOLLAND (McDonnell Douglas Corp.)

Jun. 1980

M-FS-25125

Vol. 4, No. 4, p. 584

Very flexible computer-assisted numerical analysis is used to solve dynamic fluid-flow equations characterizing computer-controlled heat dissipation system developed for Spacelab. Losses caused by bends, ties, fittings, valves, and like are easily included,

and analysis can solve both steady-state and transient cases. It can also interact with parallel thermal analysis.

B79-10592

GENERALIZED PLOTTING AND CONTOURING PACKAGE

D. RUBIN (Computer Sciences Corp.)

Jun. 1980

GSFC-12367

Vol. 4, No. 4, p. 584

PLOTPAK is complete general purpose plotting and contouring package. Flexible and easy-to-use system, it produces line-printer, television-screen, and DICOMED plots. Plots, from quick and simple to complex and sophisticated, can be generated with only basic knowledge of FORTRAN and PLOTPAK commands.

B79-10593

VITERBI/ALGEBRAIC HYBRID DECODER

R. W. BOYD (Mississippi State Univ.), F. M. INGELS (Mississippi State Univ.), and C. MO (Mississippi State Univ.)

Jun. 1980

M-FS-25095

Vol. 4, No. 4, p. 585

Decoder computer program is hybrid between optimal Viterbi and optimal algebraic decoders. Tests have shown that hybrid decoder outperforms any strictly Viterbi or strictly algebraic decoder and effectively handles compound channels. Algorithm developed uses syndrome-detecting logic to direct two decoders to assume decoding load alternately, depending on real-time channel characteristics.

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- AVALANCHE DIODES**
Fiber-optic crossbar switch
KSC-11104 879-10006 01
Low-noise current regulator
NPO-14070 879-10011 01
JANTX/N937B Zener diode
M-FS-15247 879-10460 01
JANTX/N972B Zener diode
M-FS-25248 879-10461 01
JANTX/N98B Zener diode
M-FS-25249 879-10462 01
JANTX1N4570A Zener diode
M-FS-25268 879-10465 01
- AXIAL FLOW PUMPS**
Axial-flow turbopumps
LEWIS-13228 879-10273 07
- AZIMUTH**
Azimuth correlator design for IC chip
NPO-14614 879-10451 01
- B**
- BACKGROUND NOISE**
Improved InSb photodiode preamplifier circuit
NPO-14418 879-10007 01
- BACKLOBES**
Low-backlobe microwave transmitting horn
NPO-14077 879-10003 01
- BACTERIA**
Fuel gas from biodegradation
M-FS-23957 879-10042 03
Platinum electrodes for electrochemical detection of bacteria
LANGLEY-12462 879-10228 05
- BACTERIOLOGY**
Identification of micro-organisms
MSC-18358 879-10085 05
- BAFFLES**
All-metal muffler for ducts
ARC-11159 879-10262 07
A tool for installation and removal of cylindrical baffles
M-FS-19508 879-10554 07
- BALL BEARINGS**
Lash-free spherical bearing
M-FS-23447 879-10259 07
- BALLS**
Quartz ball valve
NPO-14473 879-10128 07
- BEAM SPLITTERS**
Fabricating wedge-shaped beam splitters
GSFC-12348 879-10326 03
- BEAMS (SUPPORTS)**
Foldable beam
LANGLEY-12076 879-10271 07
- BEARINGS**
Friction coefficients of PTFE bearing liner
M-FS-19389 879-10111 06
Lash-free spherical bearing
M-FS-23447 879-10259 07
- Composite bearing liners have service temperature of 600 F
LEWIS-13277 879-10261 07
Long-wearing TFE/metal bearings
MSC-15994 879-10409 07
- BELLOWS**
Welding multiple plies with an electron beam
M-FS-19428 879-10581 08
- BENDING**
Safe bending of boron/aluminum sheets
MSC-19525 879-10428 08
Tube-shape verifier
MSC-19623 879-10571 08
- BENDING FATIGUE**
Fatigue properties of columbium alloy
MSC-18256 879-10225 04
- BENDING MOMENTS**
Accurate determination of work in three-point bend tests
LEWIS-13034 879-10236 06
Improved displacement measurement in bend testing
LEWIS-13035 879-10237 06
Deflectometer for precracked Charpy and jic bend tests
LEWIS-13090 879-10386 06
- BIBLIOGRAPHIES**
An annotated energy bibliography
LANGLEY-12488 879-10065 03
- BINARY ALLOYS**
Single-, two-, and three-phase binary-alloy systems
LANGLEY-12381 879-10514 04
- BINARY DATA**
Binary-to-Manchester encoders
MSC-16546 879-10157 01
- BIOINSTRUMENTATION**
Coupler for surgery on small animals
ARC-11114 879-10230 05
- BIRTH**
Monitoring fetal pH by telemetry
GSFC-12507 879-10517 05
- BOATTAILS**
Separation region on boat-tail nozzles
LANGLEY-12453 879-10422 07
- BODY FLUIDS**
Extracting trace substances from biological fluids
MSC-18522 879-10516 05
- BODY KINEMATICS**
Dynamic simulation and stability analysis
GSFC-12422 879-10113 06
- BODY MEASUREMENT (BIOLOGY)**
Low-dose total-body-calcium analysis
MSC-18282 879-10233 05
Anthropometric sourcebook
MSC-18500 879-10234 05
- BOILERS**
Performance test for a solar water heater
M-FS-25114 879-10055 03
Fluidized coal combustion
NPO-14273 879-10070 04
- BOLTS**
Retainers for threaded parts
MSC-16198 879-10264 07
Extra-strong 'floating nut'
MSC-16938 879-10270 07
- BONDING**
Room-temperature bonding of thin plastic sheets
NPO-14346 879-10138 08

BONES

BONES

Low-dose total-body-calcium analysis
MSC-18282 879-10233 05

BORING MACHINES

Low-cost boring mill
KSC-11112 879-10268 07

BORON REINFORCED MATERIALS

Safe bending of boron/aluminum sheets
MSC-19525 879-10428 08

BOULES

Cutting silicon for solar cells
NPO-14406 879-10146 08

BOUNDARY LAYER SEPARATION

Separation region on boattail nozzles
LANGLEY-12453 879-10422 07

BRAZING

Furnace brazing under partial vacuum
M-FS-19363 879-10137 08
Electrodeposition process reduces cost of cold plates
MSC-19524 879-10570 08
Protecting brazing furnaces from air leaks
M-FS-19379 879-10574 08
Brazing titanium to stainless steel
LANGLEY-11441 879-10577 08
Thermal jack
M-FS-19365 879-10579 08

BUBBLE MEMORY DEVICES

Bubble-domain detector
LANGLEY-12241 879-10306 01

BUDGETING

Annuity-estimating program
ARC-11139 879-10291 09

BUILDINGS

Analysis of building heating and cooling
NPO-14683 879-10067 03

BURNERS

Flat-flame burner
LEWIS-13161 879-10218 04

BURNING TIME

Burn-test apparatus for fiber composites
NPO-14578 879-10109 06

BURNS (INJURIES)

Microcomputer helps evaluate skin burns
NPO-14402 879-10082 05
Improved capacitive EKG electrode
MSC-18321 879-10232 05

BUTT JOINTS

Fixture for limited-access welding
MSC-16698 879-10135 08

BYPASSES

Improved isolation in double-balanced mixers
NPO-14415 879-10012 01

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CABLES

Cable-fault locator
KSC-10899 879-10024 02
Simpler cabling and power link for remote readouts
GSFC-12411 879-10028 02

CADMIUM SULFIDES

CdInP semiconductor alloy
LANGLEY-12405 879-10491 03

CALCIFICATION

Low-dose total-body-calcium analysis
MSC-18282 879-10233 05

CALCIUM

Low-dose total-body-calcium analysis
MSC-18282 879-10233 05

CALCULATORS

Airplane stability programs for pocket calculators
LANGLEY-12479 879-10248 06

CALIBRATING

Self-calibrating threshold detector for noisy signals
MSC-16370 879-10009 01
Proposed Josephson voltage standard
M-FS-23845 879-10482 03

CALORIMETERS

Containerless high-temperature calorimeter
M-FS-23923 879-10086 06

CAMERAS

Film-advance monitor
LANGLEY-12474 879-10119 07
Multiple-camera automatic controller
LEWIS-12711 879-10175 02

CANCER

Wideband electronics for ultrasonic tissue characterization
NPO-14461 879-10229 05

CAPACITANCE

Improved insulator layer for MIS devices
LANGLEY-12455 879-10302 01
Measuring charge nonuniformity in MOS devices
NPO-14585 879-10308 01

CAPACITORS

Improved metalized polycarbonate capacitor
M-FS-25142 879-10156 01
High-energy-density cylindrical capacitors
LEWIS-12999 879-10283 08
High-energy-density flat flexible capacitors
LEWIS-13000 879-10284 08

CARBON COMPOUNDS

Burn-test apparatus for fiber composites
NPO-14578 879-10109 06

CARBON FIBER

Determining resin/fiber content of laminates
LANGLEY-12442 879-10216 04
Graphite/epoxy-tape test specimens
MSC-18495 879-10527 06

PLASTICS

Thermoluminescence analysis of aerosols
LANGLEY-12046 879-10208 04

CARDIOVASCULAR SYSTEM

Trifunctional transducer for myocardial monitoring
NPO-14329 879-10518 05

CARRIER INJECTION

Improved degradation resistance of (AlGa)As lasers
LANGLEY-12242 879-10486 03

CASES (CONTAINERS)

Antitheft container for instruments
GSFC-12399 879-10103 06

CASSEGRAIN ANTENNAS

Limited scan dual-band high-gain antenna
NPO-14038 879-10167 02

CASTING

Vacuum casting of thick polymeric films
NPO-14534 879-10278 08

CATALYSTS

Controlled metal-film deposition on alumina substrates
ARC-11214 879-10080 04
Detecting oxygen in hydrogen or hydrogen in oxygen
MSC-18380 879-10365 04

CAULKING

Heat- and chemical-resistant oxidazole elastomers
ARC-11253 879-10355 04

CENTER OF GRAVITY

Accurate measurements of mass and center of mass
NPO-14428 879-10095 06
Mass properties of a rigid structure
LANGLEY-12454 879-10441 09

CENTRIFUGAL PUMPS

Centrifugal reciprocating compressor
NPO-14597 879-10407 07

CENTRIFUGES

Improved optics for an ultracentrifuge
NPO-13657 879-10375 05

CENTROIDS

Accurate measurements of mass and center of mass
NPO-14428 879-10095 06
Centroids, moments, and radii of gyration
LEWIS-12765 879-10117 06

CERAMIC COATINGS

Low absorptance porcelain-on-aluminum coating
M-FS-23879 879-10077 04
Repairing ceramic insulating tiles
MSC-18368 879-10426 08
Longer shelf life for ceramic slurries
MSC-18543 879-10510 04
Inhibiting oxidation of tungsten at high temperatures
M-FS-19347 879-10569 08

CERAMICS

Characterizing glass frits for slurries
MSC-18322 879-10101 06
Repairing cracked glass
KSC-11097 879-10134 08

CERTIFICATION

Certification tests on the solar-powered pump
M-FS-25144 879-10201 03
Certification of the concentrating solar collector
M-FS-25220 879-10345 03

CHARACTERIZATION

Characterizing glass frits for slurries
MSC-18322 879-10101 06

CHARGE COUPLED DEVICES

Reliability of imaging CCD's
M-FS-25039 879-10013 01
Electronic pictures from charged-coupled devices
GSFC-12324 879-10015 02

CHARGE DISTRIBUTION

Measuring charge nonuniformity in MOS devices
NPO-14585 879-10308 01

CHARGE TRANSFER

Preionized discharge for short-wavelength laser
NPO-13945 879-10186 03

CHARPY IMPACT TEST

Deflectometer for precracked charpy and jic bend tests
LEWIS-13090 879-10386 06

CHEMICAL COMPOSITION

Instrument for aerosol characterization
NPO-14320 879-10209 04

CHEMICAL REACTORS

- A reactor for more efficient solar cells
NPO-14381 879-10074 04
- Chemical-vapor-deposition reactor
NPO-14137 879-10075 04
- Quartz ball valve
NPO-14473 879-10128 07
- New approach to purifying silicon
NPO-14474 879-10367 04
- Compact reactor for onboard hydrogen generation
LEWIS-13033 879-10368 04

CHLOROPHYLLS

- Marine chlorophyll a analysis
LANGLEY-12293 879-10048 03

CHRONOPHOTOGRAPHY

- Cinematographic specimen housing
LANGLEY-12047 879-10231 05

CINEMATOGRAPHY

- Cinematographic specimen housing
LANGLEY-12047 879-10231 05

CIRCUIT BOARDS

- Repairing flat cables
LANGLEY-11950 879-10557 08

CIRCUIT BREAKERS

- Solid-state power controller
MSC-16661 879-10300 01

CIRCUIT PROTECTION

- Minimizing spikes in switching-regulator circuits
NPO-14505 879-10303 01
- Surge protection with automatic reset
MSC-18356 879-10305 01
- Overload protection for switching regulators
MSC-18513 879-10450 01

CIRCUIT RELIABILITY

- Low-noise current regulator
NPO-14070 879-10011 01
- Reliability of imaging CCD's
M-FS-25039 879-10013 01
- Removing overcoatings from microcircuits
M-FS-23851 879-10285 08

CIRCUITS

- Burn-test apparatus for fiber composites
NPO-14578 879-10109 06

CIRCULAR POLARIZATION

- Wide-beam flush-mounted antenna
MSC-16800 879-10169 02

CIRCULATORY SYSTEM

- High-resolution echocardiography
NPO-14349 879-10081 05

CLAMPS

- Attaching strain transducers to fragile materials
MSC-16580 879-10105 06
- Fixture for limited-access welding
MSC-16698 879-10135 08

CLEAN ENERGY

- Burning crude oil without pollution
NPO-14344 879-10078 04

CLEANING

- Continuous sterilization of plumbing systems
KSC-11085 879-10079 04
- Precise wet-chemical etching
NPO-14339 879-10364 04

CLOSED CIRCUIT TELEVISION

- Viewing electron-beam welds in progress
M-FS-19364 879-10580 08

CLOUDS (METEOROLOGY)

- Meteorological data-processing package
GSFC-12372 879-10206 03

CLUTTER

- Eliminating clutter in synthetic-aperture radar
NPO-14035 879-10019 02

COAL

- Ensuring flat cuts in longwall mining
M-FS-23726 879-10118 07
- Measuring coal thickness
M-FS-23979 879-10363 04
- An improved capillary rheometer
NPO-14501 879-10366 04

COAL LIQUEFACTION

- Improved coal-slurry pipeline
NPO-14425 879-10041 03

COAL UTILIZATION

- Irradiation pretreatment for coal desulfurization
NPO-14104 879-10069 04
- Fluidized coal combustion
NPO-14273 879-10070 04

COATING

- Production of large-area electrets
M-FS-23186 879-10049 03
- A continuous silicon-coating facility
NPO-14373 879-10072 04
- Silicon source for vacuum deposition
LANGLEY-12356 879-10076 04
- Audible monitor for electroplating
M-FS-19333 879-10106 06

COATINGS

- Low absorptance porcelain-on-aluminum coating
M-FS-23879 879-10077 04
- Repairing cracked glass
KSC-11097 879-10134 08
- Vapor-deposited graded-thickness films
GSFC-11806 879-10143 08
- Improved silicon/carbon interface for solar cells
NPO-14421 879-10155 01
- Water-soluble fluorocarbon coating
MSC-16562 879-10212 04
- Water-based intumescent paint
MSC-16609 879-10213 04
- Rotatable fixture for spray coating
ARC-11110 879-10274 08
- Removing overcoatings from microcircuits
M-FS-23851 879-10285 08

COAXIAL CABLES

- Simpler cabling and power link for remote readouts
GSFC-12411 879-10028 02

COCKPIT SIMULATORS

- A closed-loop control-loading system
LANGLEY-12167 879-10029 02

CODERS

- Binary-to-Manchester encoders
MSC-16546 879-10157 01

CODING

- TV audio and video on the same channel
MSC-16241 879-10017 02
- Improved reader for magnetically-encoded ID cards
NPO-13517 879-10160 01
- Lock detector for noise-coded signals
NPO-14435 879-10324 02
- Modern programming language
NPO-14105 879-10443 09
- Digital generation of command-encoder waveforms
GSFC-12203 879-10478 02

COEFFICIENT OF FRICTION

- Friction coefficients of PTFE bearing liner
M-FS-19389 879-10111 06

COHERENT RADAR

- Eliminating clutter in synthetic-aperture radar
NPO-14035 879-10019 02

COLLIMATORS

- Optical system for multispectral scanner
MSC-18255 879-10047 03
- Improving maser frequency stability
GSFC-12400 879-10331 03

COMBUSTION

- Burning crude oil without pollution
NPO-14344 879-10078 04

COMBUSTION CHAMBERS

- Fluidized coal combustion
NPO-14273 879-10070 04

COMMUNICATION CABLES

- Bidirectional Manchester repeater
MSC-18414 879-10299 01
- Interleaved shielding for cables
MSC-18369 879-10311 01
- High-acceleration cable deployment
ARC-11256 879-10547 07

COMMUNICATION EQUIPMENT

- Components for an S-band communication subsystem
NPO-13955 879-10022 02
- A telephone multiline signaling system
KSC-11023 879-10030 02
- Variable-clock-rate A/D converter
MSC-18541 879-10309 01
- Low-profile communications antenna
MSC-16683 879-10321 02
- A reliable solid-state RF transfer switch
MSC-16890 879-10454 01

COMMUTATORS

- Direct-current drive for ac motors
NPO-14427 879-10296 01

COMPARATOR CIRCUITS

- Window comparator for voltages
FRC-10090 879-10445 01
- Automatically classifying Earth features from orbit
LANGLEY-12589 879-10493 03

COMPARATORS

- Offset compensation for A/D converters
NPO-13438 879-10163 01

COMPILERS

- Compiler validates units and dimensions
KSC-11054 879-10437 09

COMPONENT RELIABILITY

- Fault-tolerant computer system
NPO-14562 879-10171 02
- Semiconductor step-stress testing
M-FS-25329 879-10455 01
- JANTX1N645-1 diode
M-FS-25243 879-10456 01
- JANTX1N649-1 diode
M-FS-25344 879-10457 01
- JANTX/N746A diode
M-FS-25245 879-10458 01
- JANTX/N759A voltage regulating diode
M-FS-25246 879-10459 01
- JANTX/N937B Zener diode
M-FS-15247 879-10460 01
- JANTX/N972B zener diode
M-FS-25248 879-10461 01
- JANTX/N98B Zener diode
M-FS-25249 879-10462 01
- JANTX/N1202A switching diode
M-FS-25250 879-10463 01
- JANTX1N3893 diode
M-FS-25266 879-10464 01

JANTX1N4570A zener diode
M-FS-25268 B79-10465 01
JANTX1N5415 diode
M-FS-25270 B79-10466 01
JANTX1N5417 diode
M-FS-25271 B79-10467 01
JANTX1N5420 diode
M-FS-25272 B79-10468 01
JANTX1N5550 switching diode
M-FS-25273 B79-10469 01
JANTX1N5552 switching diode
M-FS-25274 B79-10470 01
JANTX1N5554 switching diode
M-FS-25275 B79-10471 01
JANTX1N5614 switching diode
M-FS-25276 B79-10472 01
JANTX1N5615 switching diode
M-FS-25277 B79-10473 01
JANTX1N5618 switching diode
M-FS-25278 B79-10474 01
JANTX1N5619 diode
M-FS-25279 B79-10475 01

COMPOSITE MATERIALS

Burn-test apparatus for fiber composites
NPO-14578 B79-10109 06
Fibrous refractory composite insulation
ARC-11169 B79-10224 04
Composite bearing liners have service temperature of 600 F
LEWIS-13277 B79-10261 07
Temperature and moisture analysis in composites
LANGLEY-12452 B79-10373 04
Improved flaw-detection method
LANGLEY-11866 B79-10378 06
Vacuum-bonded covering withstands low temperatures
MSC-16235 B79-10509 04
Structurally-continuous composite corners
LANGLEY-11942 B79-10586 08

COMPOSITE STRUCTURES

Plug and drill template
MSC-16748 B79-10120 07
Fastening hardware to honeycomb panels
MSC-16752 B79-10142 08
Plastic film insulates solar cells from metal substrate
M-FS-25007 B79-10145 08
Analysis of fatigue damage in composites
LANGLEY-12431 B79-10220 04
Use of composites in electric vehicles
NPO-14615 B79-10226 04
Composites of immiscible metals
M-FS-23816 B79-10508 04
Detecting insulation defects in metal/plastic films
M-FS-25127 B79-10524 06
Graphite/epoxy-tape test specimens
MSC-18495 B79-10527 06

COMPRESSED GAS

Simple noise suppressor for vented high-pressure gas
LEWIS-13231 B79-10265 07

COMPRESSION LOADS

Mechanical-load indicator
MSC-19511 B79-10534 06

COMPRESSION TESTS

Static load testing of a liquid solar collector
M-FS-25115 B79-10057 03
Improved displacement measurement in bend testing
LEWIS-13035 B79-10237 06

Testing panels in shear and biaxial compression
MSC-16132 B79-10241 06

COMPRESSORS

Centrifugal reciprocating compressor
NPO-14597 B79-10407 07

COMPUTER DESIGN

Fault-tolerant computer system
NPO-14562 B79-10171 02
Switching reduces computer power requirement
LANGLEY-11958 B79-10480 02

COMPUTER GRAPHICS

Photomask and pattern programs
NPO-14419 B79-10434 08
Revised adage graphics computer system
LANGLEY-12492 B79-10436 09
Generalized plotting and contouring package
GSFC-12367 B79-10592 09

COMPUTER PROGRAMS

Aircraft mission analysis
LANGLEY-12299 B79-10112 06
Minicomputer version of SPAR
LANGLEY-12370 B79-10115 06
Hinge-connected rigid bodies
NPO-11964 B79-10116 06
Redundant system reliability analysis
LANGLEY-12069 B79-10153 09

COMPUTER STORAGE DEVICES

Real-time video-image analysis
NPO-14282 B79-10018 02
Optical memories in digital computing
M-FS-23897 B79-10032 02
Troubleshooting plated-wire memories
M-FS-23903 B79-10099 06
Conserving power in computer memories
LANGLEY-11952 B79-10477 02

COMPUTER SYSTEMS PROGRAMS

Programming techniques for CDC equipment
LANGLEY-12486 B79-10289 09

COMPUTER TECHNIQUES

Microcomputer helps evaluate skin burns
NPO-14402 B79-10082 05
Computer analysis of LANDSAT data
M-FS-25105 B79-10204 03
Computer measurement of arterial disease
NPO-14266 B79-10377 05

COMPUTERIZED DESIGN

Development of CMOS integrated circuits
M-FS-25121 B79-10165 01

COMPUTERIZED SIMULATION

Dynamic simulation and stability analysis
GSFC-12422 B79-10113 06
Navigation-aid power systems
NPO-14466 B79-10176 02
Electric-car simulation
NPO-14570 B79-10394 06
Coupled-cavity traveling-wave tubes
LEWIS-12861 B79-10396 06

Low-aspect-ratio wings
LANGLEY-12490 B79-10399 06
Solar array manufacturing industry simulation
NPO-14747 B79-10435 08
Spacecraft trajectory
LEWIS-13248 B79-10546 06

CONCENTRATION (COMPOSITION)

Relating viscosity to polymer concentration
NPO-14609 B79-10357 04

CONCENTRATORS

Variable-shape solar-energy concentrator
NPO-13736 B79-10038 03
Lightweight, economical solar concentrator
M-FS-23727 B79-10180 03

CONFIGURATION MANAGEMENT

Test-configuration identifiers
KSC-11087 B79-10102 06

CONNECTORS

Strain relief for power-cable connectors
MSC-19497 B79-10310 01
Remotely controlled latch
MSC-18365 B79-10403 07

CONSTRUCTION

Laser alignment of large assemblies
MSC-19346 B79-10097 06

CONTOURS

Gage for 3-d contours
MSC-19589 B79-10383 06
Generalized plotting and contouring package
GSFC-12367 B79-10592 09

CONTROL EQUIPMENT

Fast-response power saver for induction motors
M-FS-23988 B79-10004 01
Slip sensor
NPO-14655 B79-10405 07

CONTROL SIMULATION

Linear continuous and sampled-data systems
FS-10114 B79-10440 09

CONTROL VALVES

Zero-leak valve
NPO-14717 B79-10421 07

CONTROLLERS

Controller for solar heating-design package
M-FS-25009 B79-10062 03

CONVEXITY

Variable-shape solar-energy concentrator
NPO-13736 B79-10038 03

COOLING

Analysis of building heating and cooling
NPO-14683 B79-10067 03

COOLING SYSTEMS

Rankine-cycle solar-cooling systems
M-FS-25094 B79-10051 03
Rankine-cycle heating and cooling systems
M-FS-23998 B79-10052 03
The design of solar-heating and cooling systems
M-FS-25106 B79-10192 03
Ozone inhibits corrosion in cooling towers
NPO-14340 B79-10362 04

CORE STORAGE

Improving low-illumination video
MSC-14841 B79-10016 02
Programming techniques for CDC equipment
LANGLEY-12486 B79-10289 09

CORNERS

Structurally-continuous composite corners
LANGLEY-11942 B79-10586 08

SUBJECT INDEX

CORRELATION DETECTION

Eliminating clutter in synthetic-aperture radar
NPO-14035 879-10019 02

CORRELATORS

Azimuth correlator for synthetic aperture radar
NPO-14019 879-10020 02
Azimuth correlator design for IC chip
NPO-14614 879-10451 01

CORROSION PREVENTION

Ozone inhibits corrosion in cooling towers
NPO-14340 879-10362 04
Simplified installation of thrust bearings
M-FS-19473 879-10555 07

CORROSION RESISTANCE

Strong, corrosion-resistant aluminum tubing
MSC-18040 879-10417 07

COST ANALYSIS

Cost analysis of hot-air solar-heating systems
M-FS-25092 879-10063 03
Model for refining operations
LEWIS-13047 879-10293 09
Low-cost production of solar-cell panels
NPO-14453 879-10432 08
Solar array manufacturing industry simulation
NPO-14747 879-10435 08

COST ESTIMATES

Estimating the cost of production stoppage
M-FS-23884 879-10149 09

COST REDUCTION

Cost-reduction analysis for a solar-heating system
M-FS-25152 879-10202 03
Cost savings in LSI fabrication
M-FS-25079 879-10589 08

COUNTERS

Variable-resolution counter
LANGLEY-12530 879-10444 01

COUNTING CIRCUITS

Variable-clock-rate A/D converter
MSC-18541 879-10309 01

COUPLERS

Components for an S-band communication subsystem
NPO-13955 879-10022 02

COUPLING CIRCUITS

Bubble-domain detector
LANGLEY-12241 879-10306 01
Biased-receiver digital interface
MSC-14968 879-10448 01

COUPLINGS

Artificial limb connector
KSC-11069 879-10083 05
Extra-safe tractor-trailer coupling
FRC-10081 879-10258 07
Remotely controlled latch
MSC-18365 879-10403 07
Positive isolation disconnect
MSC-16043 879-10410 07
Cryogenic seal for instrument wires
MSC-18450 879-10416 07

CRACK INITIATION

Arc-termination cracks in inconel 718 and incoloy 903
M-FS-25089 879-10588 08

CRACK PROPAGATION

Crack-opening displacement transducer
LANGLEY-12485 879-10381 06

CRACKING (FRACTURING)

Resonant-fatigue cracking apparatus
LEWIS-13037 879-10520 06

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M-FS-23799 879-10107 06
Repairing cracked glass
KSC-11097 879-10134 08

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LEWIS-13173 879-10221 04

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M-FS-25151 879-10203 03

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ARC-11170 879-10507 04

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NPO-14373 879-10072 04

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MSC-16235 879-10509 04

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M-FS-19498 879-10370 04

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NPO-14297 879-10223 04
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LANGLEY-12462 879-10228 05

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Heat-shrinkable film improves adhesive bonds
MSC-18437 879-10429 08
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ARC-11170 879-10507 04

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NPO-14451 879-10050 03

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NPO-14070 879-10011 01
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MSC-14934 879-10452 01

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LEWIS-13247 879-10252 06

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LEWIS-13079 879-10132 07

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M-FS-23873 879-10090 06

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NPO-13777 879-10438 09

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LANGLEY-11952 879-10477 02

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KSC-11054 879-10437 09

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FRC-10121 879-10439 09

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GSFC-11946 879-10114 06
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NPO-14530 879-10447 01

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LANGLEY-12492 879-10436 09

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LANGLEY-12589 879-10493 03

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- Maximum-likelihood data decoder
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- Binary synchronous simulator
KSC-11096 879-10479 02
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- Maximum-likelihood data decoder
NPO-13574 879-10172 02
- Viterbi/algebraic hybrid decoder
M-FS-25095 879-10593 09

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KSC-11023 879-10030 02
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- Continuous sterilization of plumbing systems
KSC-11085 879-10079 04
- Cleaning contaminated superalloy powders
LEWIS-13041 879-10279 08

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LANGLEY-11575 879-10126 07

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- Reliability of nondestructive evaluation data
LEWIS-12908 879-10257 06

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- No-reheat air-conditioning
GSFC-12191 879-10330 03

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NPO-14354 879-10068 04

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LANGLEY-12490 879-10399 06

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NPO-13517 879-10160 01

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LANGLEY-11575 879-10126 07
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ARC-11256 879-10547 07

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- 'Self-packaging' desiccant
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LANGLEY-12370 879-10115 06
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ARC-11134 879-10185 03

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MSC-18255 879-10047 03

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LANGLEY-12381 879-10514 04

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- GIN, B.**
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LANGLEY-12427 879-10275 08
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MSC-16059 879-10564 08
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NPO-14373 879-10072 04
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M-FS-22957 879-10553 07
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MSC-16246 879-10066 03
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NPO-14683 879-10067 03
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NPO-13777 879-10438 09
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NPO-14597 879-10407 07
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M-FS-23753 879-10292 09
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M-FS-25079 879-10589 08
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ARC-11239 879-10227 05
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M-FS-25125 879-10591 09
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LANGLEY-12442 879-10216 04
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M-FS-23846 879-10122 07
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MSC-18298 879-10139 08
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NPO-14605 879-10369 04

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M-FS-25024 879-10100 06
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GSFC-12507 879-10517 05
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M-FS-25039 879-10013 01

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ARC-11114 879-10230 05

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M-FS-25050 879-10567 08

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LEWIS-13090 879-10386 06

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LEWIS-12913 879-10219 04
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ARC-11097 879-10217 04
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LANGLEY-12242 879-10486 03
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KSC-11105 879-10415 07
- KULESZ, P. K.**
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LEWIS-13247 879-10252 06
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MSC-18513 879-10450 01
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M-FS-23923 879-10086 06
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LANGLEY-12490 879-10399 06
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NPO-14683 879-10087 03
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NPO-14550 879-10251 06
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KSC-11103 879-10388 06
- LARSEN, L. M.**
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MSC-18196 879-10325 03
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MSC-16546 879-10157 01
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NPO-14638 879-10485 03
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LANGLEY-12249 879-10504 04
- LAWSON, B. D.**
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M-FS-23267 879-10177 03
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MSC-18368 879-10426 08
- LEAVY, W. A.**
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GSFC-12331 879-10121 07
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M-FS-25181 879-10582 08
- LEE, E. H.**
Controlled metal-film deposition on alumina substrates
ARC-11214 879-10080 04
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Low absorptance porcelain-on-aluminum coating
M-FS-23879 879-10077 04
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The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present. The author then goes on to discuss the various factors that have shaped the development of the United States, including the role of the government, the economy, and the culture. The paper concludes by suggesting that a study of the history of the United States is not only a valuable academic exercise, but also a necessary one for anyone who wishes to understand the world in which we live.

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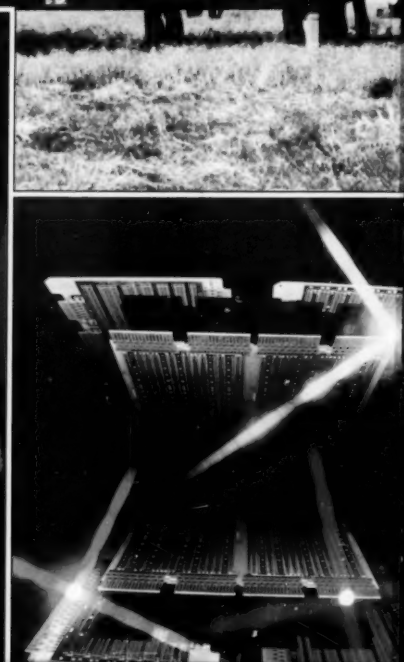
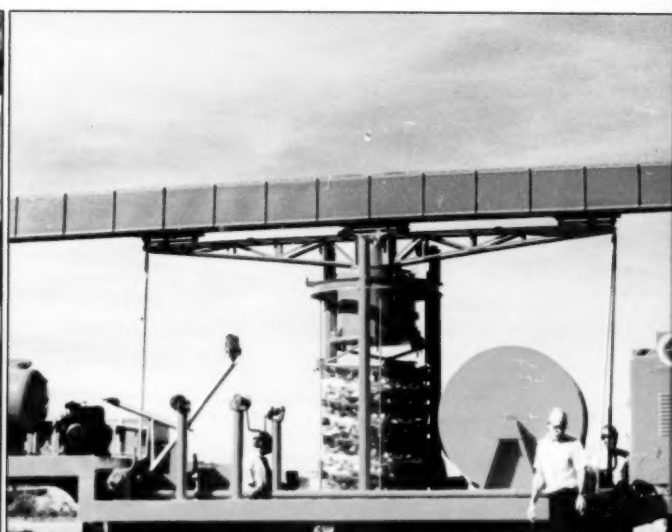
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